

"FOR THE SPECIALIZED COMMUNICATION RADIO AMATEUR"

AMATEUR TELEVISION MAGAZINE™

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"OUR 16TH YEAR"

\$2.00

FCC OKAYS DEL-NORTE UHF QRM!

420-450 MHZ. OPERATION RESTRICTED NEAR MILITARY BASES

900 MHZ. AMATEUR TESTING UNDERWAY

World News Roundup

ATV Questions and Answers

900 Mhz. Bandplan Proposed-WB4LNM!

ISA FSTV Activity Statewide Fall Reports!

New ATV "E" Code Designations

More CATV UHF Interference Complaints

Care and Feeding of ATV Linears-W6ORG!

TVRO-Phased Lock Loop Audio

TVRO-Satellite Receiver Power Block

TVRO-RF Switch Box-WA6RDA

TVRO-Satellite Location Directory!

Microwave Frequency User Listing-TEM

July A5 SSTV-DX Contest Results!

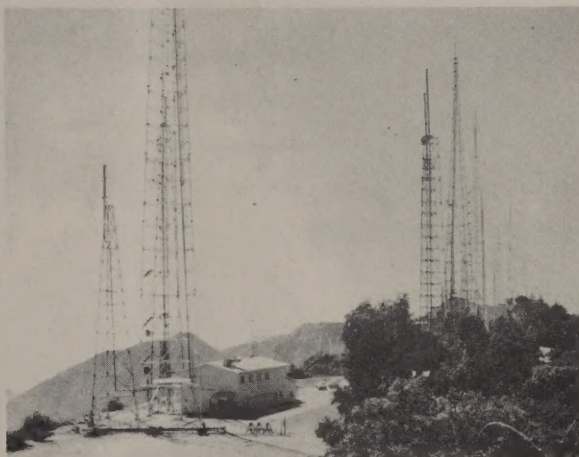
Major Breakthru TRS80C-K6AEP!

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(SPECIAL ANNUAL SSTV ISSUE
COMING IN NOVEMBER)



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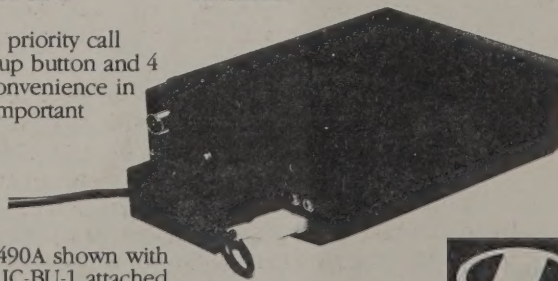
Using internal switches, the IC-490A will resume scan after an adjustable time delay, resume scan after carrier drop, sense busy or empty channels, and control scan speed.

Use the call button to automatically select a frequency designated as the primary channel overriding other transceiver functions.

The IC-490A has a highly visible green LED readout for use over a wide range of ambient light conditions. Also, there are LED annunciators for receive, send, priority, call and duplex, as well as an LED meter. For receive on SSB, AGC speed and noise blanker are controlled from the front panel. Memory backup is available with the optional IC-BU-1 memory backup unit.

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Included with the IC-490A is the new IC-HM11 microphone for remote up/down frequency control. See the new IC-490A at your dealer today.



IC-490A shown with IC-BU-1 attached



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The World System



"OFF THE REEL"

A5 Editorial Comments

Summer is gone, the kids are back in school, fall has arrived and you know what lies ahead. Now is the time to do that last minute antenna work and buckle that tower down for the snow and icy winds that are sure to arrive before you know it! ATV-DX season didn't seem to ob-

tain any great long-distance achievements this 1982 season with occasional openings over several hundred miles occurring in the months of June and July. It was quite a thrill seeing W9ZIH in bright full-color at P5 signal strength on the 4th of July as well as WBØZJP in St. Louis, Missouri (250 miles!) during the FSTV contest. Guess we now know how you ole' timers felt years ago on your first real ATV-DX! Early reports from the 1982 North American A5 FSTV Contest indicate a good amount of activity from all parts of the nation. For "the first FSTV contest" put together by A5, it appears to have went over very well. We quickly realized some glaring errors and confusing scoring methods on our first few contacts. The basic idea is sound, but with a few minor tune-ups such as more rewarding for DX distances, clarifications on transmit and receive scoring, actual mileage figures and a shift in the times of the contest so to best take advantage of morning hours on Friday, Saturday and Sunday, the next one will be even more enjoyable to work. The "purpose" of the contest was to create activity on the airwaves with television signals and to reward those who did the best job. I think, from the letters we are now receiving, that our goal was indeed achieved as many mentioned ATV'ers coming out of the woodwork that hadn't been on in years. OK, so we have to wait another year for the next FSTV contest, right? Wrong—our mail has been so positive that we will see a similar FSTV contest called "A5 ATV QSO PARTY" in February (watch our December and January issues). It's alot of work creating contests and figuring out how to best make them work. The one thing that our successful SSTV contests (January WAS-SSTV Contest and July INTERNATIONAL-DX Contest) has taught us, is "to have fun" with it. Having fun is what a contest is suppose to be all about—not QRM'ing the entire band to make a contact. Even if you participated in the FSTV contest, but did not send in your log—we would appreciate your ideas and helpful suggestions. Speaking of having "fun", there is a pretty heavy response in the SSTV section this issue concerning what is taking place on the air-waves lately. The article was torn up and written five times to attempt to tone the negative information down a bit, but in the end I think says what needs to be said publically.

The movement to an organized political body on behalf of the Amateur Television modes is growing even stronger as discussion of a U.S. ATV Society at the recent "midwestern" conference in Peoria, Illinois (September 17th) brought positive feelings. Suggestions of a board of directors (elected every 3 years & staggered), state representatives made up of FSTV and SSTV operators, and a broad outline of goals and achievements to be accomplished and a yearly meeting just prior to Dayton were all considered. We project a decision one way or the other by our January 1983 issue with a first official meeting to be held in April at Dayton. Membership in the U.S. ATV Society would be similar to the League (ARRL), Join for \$20.00 a year which gives the member A5 ATV Magazine for 12 issues as the "official journal". Inotherwords, no extra charge gang! In our September issue (page 55), we ran an A5 Questionnaire for you to fill out and return to us—come on you lazy "bums"—20¢ postage isn't going to break you—let's get those questionnaires filled out and in the mail to us, okay? A word about our upcoming A5 November issue; to make plates and print nine full color SSTV pictures on our front cover, would have cost us a fortune (estimated \$750). Thanks to the generous help of Jeremy Royale G3NOX in England, our cost was substantially reduced! Beautiful photos of on-the-air signals from the Wraase SC422A and Robot 400 converters from Italy, Sweden, England, Germany and Canada will highlight this annual SSTV issue. Some great articles such as Robert Suding's 8 and 12 second single-frame color methods, Clay Abram's major breakthrough into high resolution B/W and expanded color SSTV on the versatile TRS80C computer, George Steber's new SSTV converter, Fred Sharps method of capturing RGB pictures with a B/W camera, and lots more in our "special issue. Check your renewal dates, don't miss this issue! (For you non-SSTV'ers there will be articles of your interest also). I see sync-bars on my monitor right now—just might be Frank WAØIWF from Omaha. He said he'd be on FSTV some time this century... -QCD

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World News Roundup

Amateur Television operators and other 450 Mhz. band users, will be sharing the UHF band with a non-governmental radio location system. The FCC has granted a petition from Del Norte Technology which asked permission for the company to use spread spectrum techniques for radio location purposes "on a non-interfering" basis with Amateur Radio operations between 420-450 Mhz. All objections filed with the FCC by Amateurs were considered in the final action. They include; spread spectrum only for all of Del Norte's inland operations with "mandatory" identification every 20 minutes in a manner that can be decoded on a narrow band receiver and signing the letters "DN" in international morse code (not CW but some form of narrow band signal discernible on an Amateur transceiver). Previous reports from the west coast areas have reported interference from such devices at various levels interfering with the ATV modes of operation. Some are saying in defense of the FCC act, that interference will be minimal and at least this is another step to protect the 420-450 Mhz. band from threatening "land-mobile" use modes. Any reports of interference or reception of the spread spectrum signals are asked to be reported to A5 Magazine for a special filing of the wide-band signal effects on ATV operators to be made to the ARRL and FCC at a later date. We are also interested in non-ATV interference reports as well by Radio Amateurs.

MORE PROBLEMS FOR ATV'ERS

In a July 14th bulletin, ARRL has announced that serious new restrictions will be placed on amateurs living near key military installations with regard to their 70 cm. transmitter power in the 420-435 Mhz. bands. Effective August 16, 1982, because of National Defense considerations, the 50-watt transmitter power limit for amateur stations will be extended to two additional military areas. Also, two military locations areas of protection will be expanded. This 50-watt power restriction will be applied by the appropriate FCC Engineer In Charge and military frequency coordinator. Special case considerations may be filed with the FCC with complete personal information as to operating habits and a means of contacting the amateur station to reduce power to the 50 watt during periods of military operation. Current effective areas include Otis Air Force Base (Mass 100 mile radius), Beale AFB (Calif. 150 mile radius), Elmendorf AFB (Alaska 100 mile radius) and Grand Forks AFB (North Dakota 100 mile radius). The transmitted signal is termed "Pave Paws" and is a highly concentrated radar signal at multimegawatt peak power levels that can pick out a grapefruit size object at a thousand miles or more. The FCC provided relief to amateur satellite operators in early 1981 with 10 degree above horizon restrictions and up to 1 KW of power but it is unclear whether this protection might still be in effect.

USA ATV SOCIETY CONSIDERED

In a move to protect amateur television modes and frequencies, as well as to establish a unified and organized political organization in the United States, a United States Amateur TV Society is being researched with requested comments and input by the ATV community. This non-profit organization would be governed by a Board of Directors elected by membership with several correspondence meetings and one annual meeting at Dayton each year. Guidelines will be published in a future issue of A5 Magazine.

ATV CONTEST SUCCESS

First reports of the North American FSTV Contest were coming in at printing time with heavy ATV activity reported in the UHF areas involved. Morning and late evening openings provided some great long distance DX scoring. Comments on the contest elsewhere in this issue. Operators are encouraged to send logs, comments, criticism and photos.

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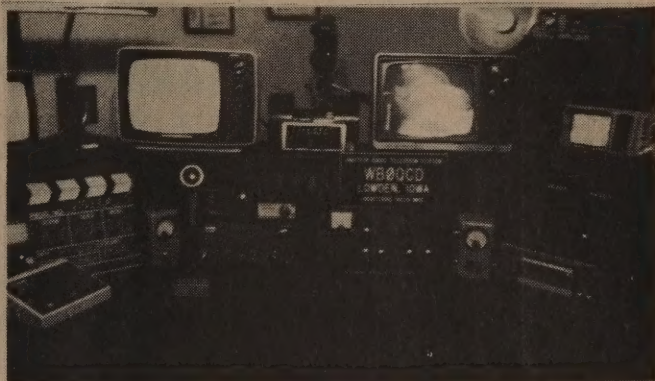
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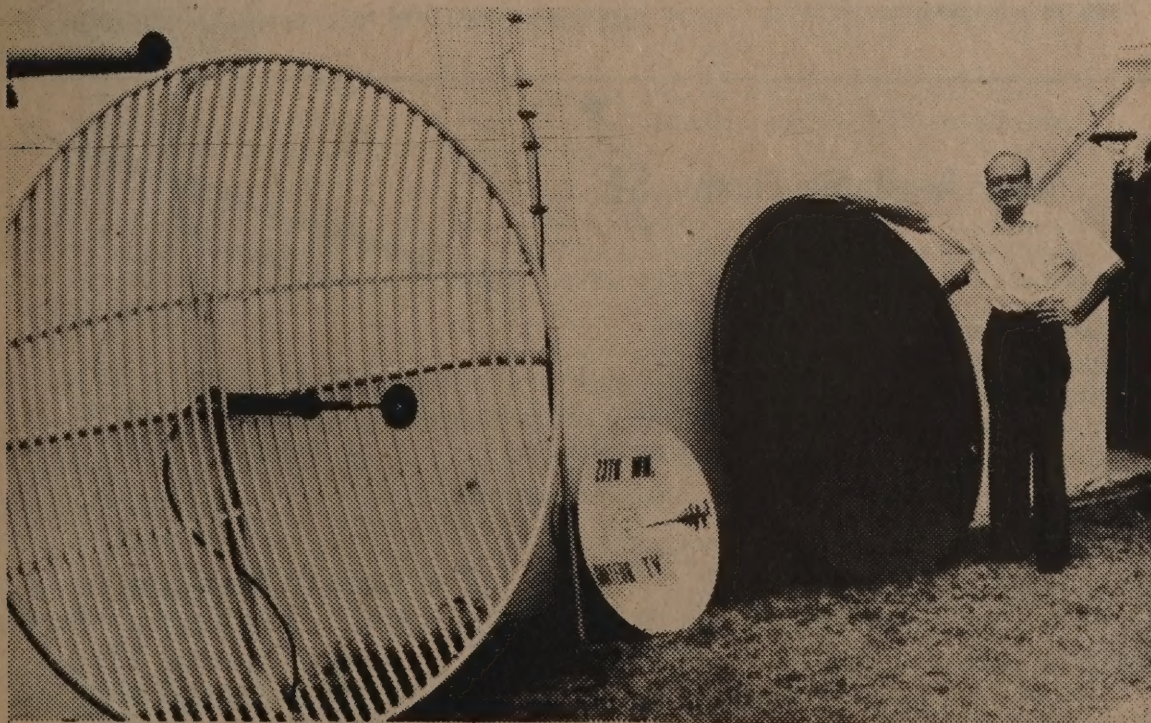
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ATV QUESTIONS & ANSWERS

lighting (especially natural lighting) and arrange your ATV equipment and any other mode rigs (two-meters) close and within reach. There is nothing more boring than seeing the ATV operator constantly getting up to adjust another piece of gear. A camera placed behind a shelf, facing the operator at eye level gives great "head-on" shots. A monitor placed near the camera forces the operator to look in the general direction of the image maker. A UHF-TV monitor should be handy to check band propagation. Videotape recorders, tapes & other video feeds should also be near the ATV center. Yes, it is hard-but not impossible to work out. Start at a corner and reposition your video equipment. Before you know it, you'll have very convenient ATV operation!



Q-"I seem to be all by myself out here and no one seems to be interested in ATV operation. How can I generate interest from some tired old blood?" A-W60RG has a great videocassette for ATV demonstrations (see his ad PC) and a number of ATV'ers around the country would be glad to make a copy of local activity for you to use at local club meetings, etc. You need desperately to get a "buddy" on with you and then get on the local repeaters or popular simplex frequencies and "talk" about ATV till it drives them crazy. Don't leave out any of the "laughs" as it let's others know that you are having fun! Look for those already on SSTV, EME, SAT, etc. Have patience, don't give up. You'll be surprised what a "little" legwork will do!



6 foot dish for 1250 Mhz., 2 1/2 foot dish for 1200 Mhz., 5 foot dish for 2300 Mhz. owned by Southern California ATV Newsletter Editor W6RVP John Dieringer

Photo by Max Gould K6GLG



SE-1a UHF ATV TRANSCEIVER:

/FREE ATV BOOK "Everything You Always Wanted to know About ATV* but were afraid to ask" (\$9.95 value) with purchase of SE1a ATV transceiver!

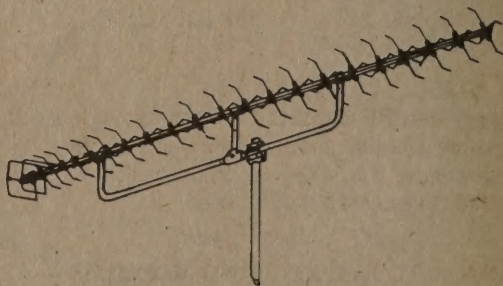
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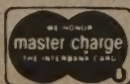
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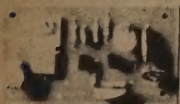
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ATV KITS AND MODULES



VM-2 VIDEO MODULATOR — Wideband collector video modulator for solid state exciters such as those from GLB and Hamtronics. Input for 4.5MHz audio sub-carrier. 2 1/2" x 1 1/2"; **\$13.95 kit, \$18.95 assembled.**



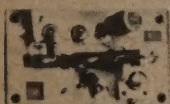
A-2 4.5MHz AUDIO SUB-CARRIER — Accepts audio from VCR or GLB audio processor to provide ATV audio on TV set. Has on-board voltage regulator and shielded inductor. 2 3/4" x 1"; **\$18.95 kit, \$24.95 assembled.**



SA-1 VIDEO SYNC AMP — Provides separate video sync gain control for VM-2 above or SE-1a transceiver. Useful when driving solid state amps. 1 3/4" x 1 1/4"; **\$14.95 assembled, \$11.95 kit.**



DC-1 UHF CONVERTOR — Varactor tuned with 2 RF stages. MRF901 input standard. Double sided stripline design. Outputs to TV ch. 2, 3 or 4. Can be tower mounted. 11 — 14vdc. 2" x 3". **\$34.95 kit, \$49.95, assembled, \$79.95 complete in box.** Add **\$15.00** for NE64535 1st stage.



P-1 WIDEBAND LOW NOISE UHF PREAMP — Uses MRF901 transistor to provide 16db gain and 1.7db noise figure. Covers 420—450MHz band. Other frequencies received with change in input inductor. 2 1/4" x 1 3/8"; **\$17.95 kit, \$26.95 assembled.** Add **\$15.00** for NE64535 Option.



LA-1 UHF AMPLIFIER — Uses 15 watt MRF641 transistor with 7.8db gain @ 470MHz. Stripline inductors with on-board pin diode antenna switching for a receiver. Designed for wideband color video with exciters such as the GLB T450L that provides up to 3 watts drive. Drilled and tapped heatsink included (4 1/2" x 1 3/4"). 1 to 3 watts drive typically gives 6 to 18 watts output. 12 — 14vdc operation @ 4 amps max. Double-sided board is 4 1/2" x 2". **\$69.95 assembled with test data.**

LA-45 UHF AMPLIFIER — Uses MRF646. Input power of 6-15 watts typ. gives 20-50 watts output. Biased for linear operation. Kit includes all parts, instructions and 4.2" x 3" double-sided stripline board. Needs 12-14 vdc @ 9 amps max. **\$59.95 kit.**

GLB T450L TRANSMITTER — 4 1/2" x 2" RF board typically supplies 2—3 watts FM output, 1 — 1 1/2 watts average video RF output. Changes for wideband video modulation provided. Comes with crystal for 439.25MHz, with other frequencies available upon request. Also includes separate 1" x 4" audio processor board which supplies audio for FM modulation or for the A-2 4.5MHz audio kit above. 12—14vdc @ 2 amps max. **\$54.95 kit, \$74.95 assembled and tuned.**

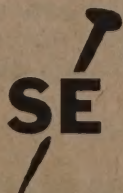
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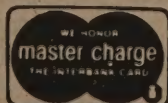


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Channel 7





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Amateur Television Magazine

900 MHZ. ATV CHANNELS PROPOSED

Amateur Television interest and activity is growing rapidly. We have seen a surge in growth largely due to SSTV'ers who have discovered the video mode via the single still-frame narrowband method and due to the rapidly deteriorating HF bands which have brought many Amateurs up to the VHF-UHF spectrums seeking new frequencies and modes of operation. We also hope that some of the displays, forums and demonstrations that all of us at one time or another have been involved in for FSTV, have just now

been "paying off". Hopefully, with the formation of an organized ATV society, to protect our 70 cm. present bandplan (which is poorly honored by other modes), we can additionally obtain a respected segment of the new 900 Mhz. Amateur bands for FSTV transmissions and receptions. A very well thought out article by John H. Klingelhoefter WB4LNM of Annapolis, Maryland appeared in the June 82 issue of 73 Magazine (pages 74-78) describing a proposed bandplan for all modes and users of the new band. In it, the various modes of Amateur Radio including a new Packet transmission mode are spread over the 902-928 Mhz. area much the same as on lower and higher present Amateur frequency allocations:

902.0 Mhz - CW/SSB

902.6 Mhz - FM voice/RPT

(mobile receive, RPT transmit)

906.0 Mhz - ATV Channel A

912.0 Mhz - ATV Channel B

918.0 Mhz - ATV Channel C

924.0 Mhz - FM voice/RPT

(mobile transmit, RPT receive)

927.4 Mhz,

928.0 Mhz - Control Links, Packet Transmissions

Three ATV Channels are recognized with 6 Mhz. spacing per channel. Wider band color signals would technically overlap a bit into each respective ATV channel, but would certainly be reduced at levels far below any self interference. Although not extensively discussed in the article, audio sub-carriers at usual 4.5 Mhz. spacing can be allowed for including Channel C at 922.5 Mhz. FM voice and repeater operations begin at 902.6 for receive only by FM users with actual FM user transmitting done with 25

Mhz. spacing beginning at 924.0 Mhz. For the first time, ATV appears to be somewhat protected from FM Repeater outputs under this proposal. Even the LSB FM subcarriers don't appear to threaten FM frequencies but will no doubt be recommended to be suppressed or removed via filters on 900 Mhz. ATV gear. Simplex CW and SSB is at the beginning of the new band at 902.0 Mhz. with protection in excess of 500 hz. which should make the SSB crowd contented.

ALL THAT "GLITTERS" MAY NOT BE GOLD

902-928 Mhz. in the United States has been used for radiofrequency heating, i.e., the Industrial Scientific and Medical Service (ISM). Early commercial and consumer microwave ovens used this wavelength, although most now have changed to 2450 Mhz for improved performance at higher frequencies. 915 Mhz. (center of the ATV Channels) was the center tuning point for their pulsed power emissions with considerable generated sidebands. Units of these frequencies still in operation are the most likely foes of ATV interference. As ATV'ers populate even higher UHF frequencies now considered microwave regions at 900 Mhz, warnings must be made that these frequencies were chosen originally as best for efficiency of heating on substances with high water content such as food and unfortunately "human flesh". The ISM services will share the new Amateur band on a secondary basis only with both services sharing the band with Government Radiolocation or radar which is a common status on other UHF/microwave band segments.

WHAT TO EXPECT FOR ATV AT 900 MHZ.

Much the same propagation traits and problems will exist at 900 Mhz. as does on 400 Mhz. Natural objects such as trees (foliage), earth, buildings, etc. will interfere with 900 Mhz. signals at even greater levels which will require a substantial increase in effective radiated power to cover the same distances with the same level of video pictures.

In urban areas, specular reflection might be somewhat less due to shorter wavelengths around tall buildings or other structures. Much research has already been conducted by telephone companies using cellular mobile radiotelephone services in the 825 to 890 Mhz. regions (can true Amateur picturephone be far off?). There is concern about flutter problems with FM mobiles, but as for Amateur Television we are use to that. If U.S. FM-Television ever comes about in popularity, perhaps this will become a problem also.

GEAR FOR 900 MHZ. OPERATION

Alot of surplus commercial gear was dumped in the 1960's and appears now and then at hamfests. It will no doubt be awhile before the cellular radiotelephone equipment begins to show up on the surplus markets. For ATV, no doubt companies like PC Electronics of California will come up with ready to go converters and transmitters or variactor doublers into the 900 Mhz. regions. Even at this writing, there are experimentors who have applied to the FCC for early licenses to operate in the 900 Mhz. areas with special FCC call designations being approved on a limited basis. Antennas for the 33-cm. band will be small enough to be built inexpensively and will be mounted on masts similar to ones used now for ATV. Yagis, corner reflectors and even dishes will dominate the 900 Mhz. scene with high gain characteristics. As soon as the band is open for operation to Amateurs (high sources say even as early as January 1982), gear should present no problem for ATV'ers.

DO WE ABANDON THE 400 MHZ. REGION?

With interest stirring about 900 Mhz. as a "new" band for Amateur operation on ATV, should we neglect 400 Mhz. areas? Of course not. In fact, other services such as FM and the satellite boys are just waiting for the 900 Mhz. band to open up so they can encourage ATV'ers to move upward. Satellite enthusiasts were left out in the 900 Mhz. region and dearly cherish their 400 and 1200 Mhz. operation areas. Some sort of agreement between ATV'ers and satellite users on shared frequencies will probably have to come about if interference between the two organizations arise after the proposed launch of Phase 3. It should always be remembered, however, that ours is also a shared band by all modes of Amateur Radio and sometime interference just has to be tolerated. (Let's hope the other services recognize this also!) 900 Mhz. will certainly be used as a repeater input or output frequency as well from 400 Mhz. For example, a 439.25 Mhz. input could be dumped out on any of the designated ATV channels. This could certainly open up a whole new area to ATV communications and services-never before possible. The hard to erect in-band 400 Mhz. ATV repeaters could be coordinated with the new 900 Mhz. frequencies for better distance and more reliable communications than our allotted 1200 Mhz. region. The important thing to remember here, is NOT to give up any ground that we now have for ATV operation. The mode is unique in itself and deserves more room. It is the ATV'ers who have stayed in the gentlemenly agreed band allocations for many years and have not encroached on other modes or services. I am sorry to say that I cannot say the same for other modes of operations.

The following references are listed for your research and opinions. Let's hear from you-the ATV operators on this proposal. Are any of you geared up or experimenting with the new 900 Mhz. region? What have you found out in regards to television transmissions and propagational studies? A followup article by Tom O'hara on what has been learned about 1200 Mhz. ATV operation will soon be published in a future issue of A5 Magazine. Let's hear your feedback and we will encompass your comments in with the upcoming article. Put your thinking caps back on!

1. Proceedings of the 1979 WARC conferences
2. Microwave Ovens-Revolution in Cooking, by D.R. McConnell, Electronic World, Aug 70
3. Happenings column, QST Sept. 81
4. Microwave Mobile Communications by Jakes, Wiley Interscience, 1974 ISBN-0471437204
5. What Happens When 900 Mhz. Takes To The Hills, Barton/Wagner, Communications Magazine Mar/Apr 1974
6. FCC Study of Land Mobile Use at 950 Mhz., R-7120 and others (A5)

Turn a few hours work into years of fun with Amateur Television.



'34"

ATV Converter *

Convert any TV receiver to a fast scan ATV monitor without incurring the expense of commercially made equipment. The Communication Concepts Inc. converter allows you to monitor 430MHz ATV signals using channel 3 or 4 on a standard TV set, without modification to the set. The kit consists of a low noise high gain RF amplifier (MRF-901), a double balanced mixer and a Varicap® controlled local oscillator. By using Varicap diode tuning, the converter can be placed directly at the receiving antenna and tuned remotely with a standard 10K potentiometer, if desired. This technique greatly increases the signal strength at the TV receiver by reducing the capacitive loss normally encountered when using high frequency signals on coax lines.

The converter requires an external 12 volt regulated power supply at 40 milliamps. For optimum performance, the converter should be mounted in a metal enclosure; thereby providing an RF shield.

ATV-1-PK Kit includes detailed step-by-step instructions, printed circuit board, and all electronic components as shown

ATV-1-PCB Printed circuit board only. **\$10.00**

ATV-1-I Instruction manual only. **\$5.00**

*Circuit board design license authorized from P.C. electronics, Arcadia, California 91006

Audio Squelch Control

You have a squelch on your 2 meter equipment; why not add a squelch to your ATV monitor. Now you can avoid the major problem of operating ATV—the annoying hiss and static when the signal is not present. With the ATV squelch, you no longer have to turn the volume down when the signal disappears and risk the chance of missing a signal.

The squelch easily connects to the TV receiver audio stage without modification of the TV, since the squelch circuit contains its own audio output stage. You must provide your own speaker. Operator safety is provided by using transformer isolation between the receiver and the squelch circuit, thus eliminating the shock hazard when using a "hot chassis" type TV receiver.



'34⁹⁵

SIL-K Complete Kit—includes a detailed instruction manual, printed circuit board and all electrical components. Kit does not include case, speaker and regulated power supply (10 to 15 volts @ 250mA).

SIL-PCB Printed circuit board only.

100 Watt Linear Amplifier

Now you can get on the air with a high power 100 watt class B linear amplifier for SSB-FM or ATV on the 420 to 450 MHz band and still not spend a lot. This kit is described in Motorola engineering bulletin EB-67 and is available in a number of configurations. For full output, a minimum of 16 watts is required for excitation with an input SWR of not higher than 2:1. Output will maintain stability with a 3:1 collector mismatch at all phase angles. A designed-in low-pass filter suppresses the 2nd harmonic to at least 63 dB down. An external power supply capable of providing 28 VDC, regulated, at 10 amps is also required.

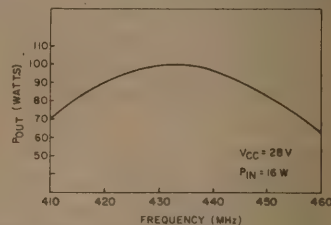
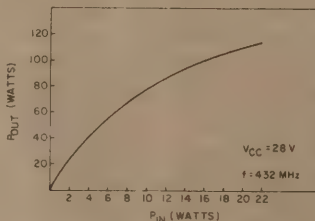


'109⁹⁵

KEB-67-PK Kit includes detailed step-by-step instructions, printed circuit board, and all electronic components as shown.

KEB-67-PCB Printed circuit board **\$14.00**

KEB-67-I Instruction manual only. **\$5.00**



P.C. Boards

The FCC does not allow us to sell Broadband RF amplifier kits in the HF range, therefore we can only offer the printed circuit board and parts on a piece-by-piece basis.

140 watt power amplifier as described in Motorola engineering bulletin EB-63. **EB-63-PCB**

100-180 watt power amplifier as described in Motorola application note, AN-762. **AN-762 PCB**

300 watt power amplifier as described in Motorola engineering bulletin EB-27A. **EB-27A PCB**

Transformers, transistors and other parts are also available.

We also specialize in hard-to-find components.

In addition to our kits, we also stock parts for other Motorola application notes and engineering bulletins. We have an in-depth stock of Motorola VHF and UHF transistors, Underwood metal clad mica capacitors (Unelco), Kemet chip capacitors, Cambion RF chokes and Ferroxcube Ferrite beads and RF chokes plus other difficult to find parts. If you are having trouble finding a part, call us, we probably have it in stock.

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from Science Workshop



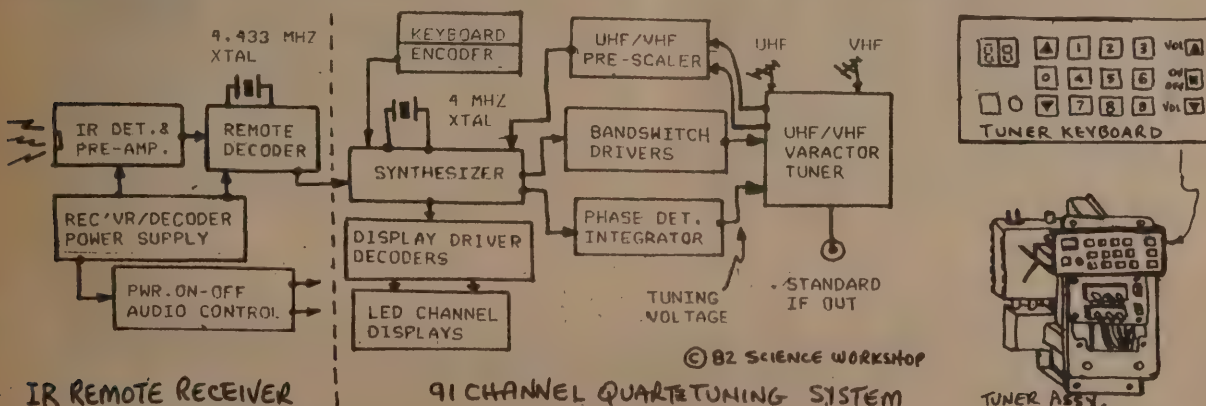
91 Channel QUARTZ TV Tuning System!

NEW (SURPLUS) WITH THE MOST RECENT ADVANCES IN DIGITAL ELECTRONIC MICRO-CIRCUITRY. TUNES ALL UHF/VHF AND MID-BAND CABLE CHANNELS WITH QUARTZ XTAL ACCURACY AND STABILITY. NO FINE TUNING- NO DRIFT. YOU INPUT DESIRED CHANNEL THRU 10 DIGIT KEYBOARD- TUNER INSTANTLY LOCKS ON AND DISPLAYS THE SELECTED CHANNEL ON 2 DIGIT READ-OUT. KEYBOARD ALSO HAS UP/DOWN SEQUENTIAL CHANNEL SCANNING KEYS- POWER ON/OFF KEY (ACTIVATES A RELAY TO TURN TV ON/OFF) AND VOLUME UP/DOWN KEYS TO CONTROL AUDIO. ASSEMBLY SIZE APPROX. 10"X6"X9".

COMPLETE INFRA-RED REMOTE CONTROL RECEIVER/DECODER. CONTAINS LOGIC AND DECODING CIRCUITRY TO ACTIVATE ALL OF THE FUNCTIONS OF THE TUNER KEYBOARD. (SCHEMATIC SUPPLIED FOR HAND-HELD IR TRANSMITTER). TRANSMITTERS ARE AVAILABLE FROM THE MANUFACTURER.

REPLACE YOUR OLD, TIRED MECHANICAL TUNER, OR BUILD A REMOTE "CABLE READY" CONTROL BOX. MOST ACCURATE TUNING SYSTEM EVER DEVELOPED FOR TV. BUILD A "COMPONENT" TV SYSTEM AT A FRACTION OF THE COST.

ADD OUR NEW VIDEO AND SOUND IF BOARD (USING "STATE-OF-THE-ART" SURFACE ACOUSTIC WAVE FILTER) TO PROVIDE BASE-BAND VIDEO AND AUDIO, AND YOU HAVE ALL OF THE ELECTRONICS TO HOOK-UP TO ONE OF THE NEW HI-DEFINITION COLOR MONITORS. ADD ONE OF OUR RCA XTAL CONTROLLED RF MODULATORS FOR CHANNEL 3 OR 4 OUTPUT. FOR DECODING, THE VIDEO SIGNAL CAN BE PROCESSED AT BASE-BAND AND THE AUDIO AND CORRECTED VIDEO CAN BE FED TO YOUR TV. NOW AUDIO COMES OUT OF THE TV SET'S SPEAKER, RATHER THAN OUT OF THE DECODER BOX. THESE LATE MODEL WIRED & TESTED TV ASSEMBLIES MAKE EXPERIMENTING A BREEZE!



© 82 SCIENCE WORKSHOP

THE COMPLETE TUNER ASSEMBLY CONTAINS 5 MAJOR SUB-ASSEMBLIES:

- (1) UHF/VHF VARACTOR TUNER
- (2) UHF/VHF PRE-SCALER
- (3) QUARTZ SYNTHESIZER
- (4) KEYBOARD W/LED DISPLAYS, I-R/DETECTOR & PRE-AMP, PLUS AMBIENT LIGHT SENSOR.
- (5) REMOTE I-R RECEIVER/DECODER.

THE SYNTHESIZER ACCEPTS CHANNEL SELECTION LOGIC INPUTS FROM EITHER THE KEYBOARD OR THE REMOTE CONTROL RECEIVER. THE SYNTHESIZER IC IS AN LSI CHIP WHOSE COMPLEXITY AND TECHNOLOGY APPROACHES THAT OF A MICROPROCESSOR. IT DIFFERS ONLY IN THAT IT IS NOT A GENERAL PURPOSE, PROGRAMMABLE MICROPROCESSOR, BUT RATHER IS "DEDICATED" TO PERFORMING SPECIFIC ACTIONS IN RESPONSE TO SPECIFIC INPUT COMMANDS.

BEST PART OF ALL, LOOK AT THESE PRICES!

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COLOR TV MAIN CIRCUIT BOARD WITH SAW FILTER.....	\$34.94
RCA XTAL CONTROLLED CHAN. 3/4 RF MODULATOR.....	\$24.95

SUPPLIED WITH SCHEMATICS AND/OR HOOK-UP INFO. PLEASE ADD \$1.50 FOR UPS.

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NOTE: FOR FASTER SERVICE, MARK ENVELOPE "QUARTZ TUNER ORDER".

A5 "FALL REPORT" FSTV ACTIVITY IN UNITED STATES OF AMERICA

NEW YORK

New FSTV Repeater located in Nyalk, New York (Rockland County 25 miles north of NYC near the Tappan Zee bridge), K2MME/R in Pamon, NY is sponsor under direction of "Rockland Repeater Association, 10 watts (soon 100), vertical polarization, color with sub-carrier audio (on-carrier input optional soon), 439.25 in/426.25 out, 700 feet ASL, reports of visual sightings from Clifton, NJ., Pomona and Garnerville, NY. Also reports from Long Island and Mahopac areas. Active operators; K2MME, WA2WEJ, WA2WEJ, WA2IYD and N2BJ. Information on this system may be obtained from N2BJ Barry J. Cohen, 21 Frederick Street, Garnerville, NY. 10923. This makes a 5th repeater known in New York state (WA2IUP NY, NY/unidentified call Mt. Beacon, NY/WB2FCN in Rochester City, NY/WR2AOV in Syosset, NY.) Alot of horizontally polarized simplex DX activity in other parts of the state. (Need more accurate reports!) *Western New York*; 439.25 Mhz. used, a number of southern Ontario. Canada stations worked, Active ATV'ers; W2BPU, W2YJ, N2BAU, KA2CKP, WA2CXW, W2ELF, W2IRU, WB2JKL, KC2KZ, W2OSW, W2RPO, K2RDD, W2UBR, KB2JB, W2WHK, WA2SHM, WA2PZV. Thanks W2BPU for info.

NEW JERSEY/PHILADELPHIA, PENNSYLVANIA

WA2KOK Dan Kernan of Vincentown, NJ. reports alot of FSTV activity in the Philadelphia/Southern NJ areas with work on the Philadelphia ATV repeater being completed very soon. 145.825 Mhz. is the two meter coordinating frequency used by locals. Reports of spuratic on/off operation of the Harrisburg, PA. ATV Repeater is submitted with locals their using 145.470 Mhz. (-600 offset) and vertical polarization. W3POS continues to be the "seen" DX'er with much of the state on horizontal polarization on 436 and 439.25 Mhz. K3ZKO Ron Cohen (I finally got your name and call right Ron) reports 145.825 is the "hot spot" to find ATV'ers with a repeater beacon (testing) every night on 421.25 Mhz. from 1930-2200 hours. WA3WPE/R in the Pittsburgh, PA. area is active and was not listed on the last ATV Repeater directory. Input 427.25/ Output 439.25 Mhz. BW/Color (Thanks for the update Clyde).

VIRGINIA

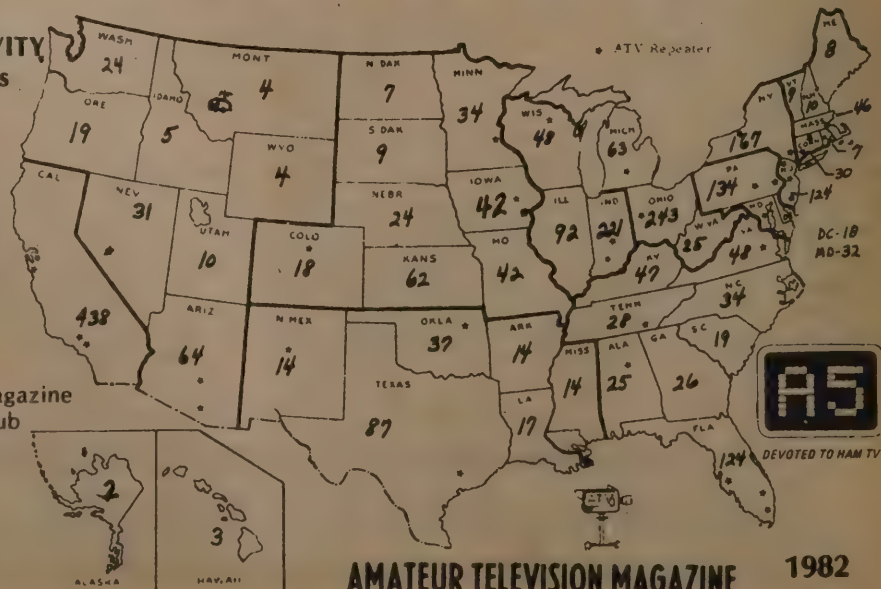
One submitted report from Don W4YDF of Norfolk, Virginia (804-588-3800) who is desperately looking for FSTV activity, especially during ducting openings between 10pm.-1 am. nightly. Don has seen NY, NJ and PA stations often. Come on Virginia-send your ATV activity reports to A5! There has to be more than Navy ships down there?

AMATEUR TELEVISION ACTIVITY Repeaters, Clubs and Groups

FSTV GROWTH STUDY BY A5 ATV MAGAZINE

Known United States FSTV
Stations April 1982

Information compiled from A5 Magazine
subscription files, surveys, ATV club
rosters, reporting groups, etc.



* Designate Known
ATV Repeater Locations

Channel 12

AMATEUR TELEVISION MAGAZINE

1982

SOUTH CAROLINA

Thanks to the tireless efforts of Gerald Cromer K4NHN and others, South Carolina ATV has "come alive" with nightly activity. A SC "ATV Conference" was held on April 27th to kick off the ATV population drive with Hap Griffin WA4UMU and K4NHN moderating the events with 25 attending. A W6ORG videotape was played for the group with demonstrations following on what is needed for ATV along with manufacturer handout sheets and copies of A5 Magazines passed out. The conference brought together four UHF'ers on 432 SSB that hadn't met each other and talk of repeaters could be heard at the conclusion of the meeting. Downconverter "kits" were mass purchased from Communication Concepts with the conference lasting nearly 3 hours. It looks like the South Carolina crew is off to a good start! Don't stress too much faith in Repeaters for ATV at the beginning Gerald-let the fellas build up their own strength stations first and take pride in working long distances and it will teach them what's needed for UHF work. Thanks for the names and updates! ATV stations; W4HEV, K4BHE, WB4UCB, N4FIR, N4GUP, KA4FEC, WA4SQS, W4PT, K4NSI, K4NHN, K4AXV, WB4EFZ, W4NZA, KB4FF, N4FUU and WA4UMU.



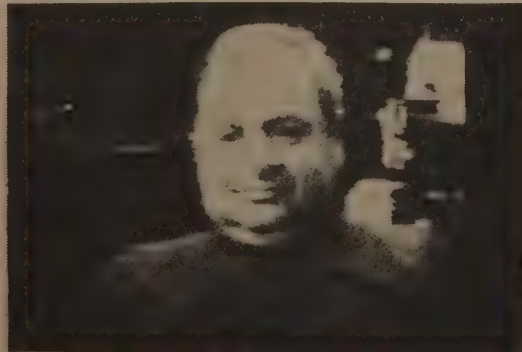
ILLINOIS



Unfortunately, Illinois ATV is a bit divided. Two groups in the Chicago area are very active and a third group operating in central and southern Illinois. DX coordinating frequencies are 144.34 (Fm/SSB), 145.58 Mhz and 144.910 Mhz. The 144.340 frequency seems to be the most active monitored. Power ATV-DX stations include N9AB, WA9EUN, W9ZIH, N9CRN, WA9CGZ and K9KK (Chicago area), N9GA Canton, K9ILA Pekin and K9KKL Springfield. N9AEP Moline is the most often seen station out of the Quad-Cities with WB9MCF in Burnside, Illinois monitored frequently near the Keokuk area. Our best estimate puts around 90 ATV'ers now active in the state. The "Midwest UHF-ATV Conference" was held September 17th in Peoria with great success. Polarization is almost all horizontal with 426.25, 436.0 and 439.25 Mhz. frequencies used in the video modes. Active ATV'ers known; N9CRN, W9ZIH, W9LK, W9YTM, K9TUC, K9KK, WA9CGZ, N9BMH, WB9FKR, WB9EWF, WB9MDK, WA9EUN, W9ITO, W9RI, N9AEP, WB9WST, K9ZFK, WB9HTM, KA9AQR, WB9MCF, WD9DJJ, N9GA, K9ILA, W9LII, WB9SWK, K9KYZ, W9BPX and W4MJT. Need More Reports!



N9BMH Marty Rotta, Milwaukee, Wisc.



WA9RYH Ed Kreckler, Wisc. Rapids, Wisc.

Channel 13

Photos by W9ZIH Chicago

OHIO/INDIANA

No DX ATV has been seen much this season (in Iowa) from Ohio or Indiana ATV'ers. Seems like the Indianapolis group lost DX fever since going vertical on the local WR9ABP repeater. K9KTH Repeater in the Bloomington area is quite active. Need alot of "Hoosier" ATV reports and pictures! (Sorry, if you dont get reports you cant print em')

IOWA

From zero ATV stations in 1980 to over 40 in 1982! Two ATV repeaters being worked on; one in Cedar Rapids (WBØVVZ/R 439.25 in/output unknown) vertical polarized. Active stations known in CR area; KBØXL, NØDAK, WBØKFB, WAØTFV, WDØEKP, WØSMS, NØDAJ, WBØVVZ. Des Moines area activity building slowly with Burlington area active with NØRS, WB9VHB, WB9MCF, WD9DUJ and more newcomers coming. Muscatine area KA9AQR, WBØMEW, WBØARW, and newcomer WBØTSG. KAØBVT and WBØQCD working long-haul DX seeing and working stations in Chicago area 200 plus miles away regularly. Other ATV Repeater now in testing at Walcott, Iowa (horizontally polarized with 8-bay dipoles) under callsign KØSVH/R with 439.25 Mhz. input (microwaved at 1280 Mhz.) 427.25 out. 144.340 Mhz. used for two-meter coordination (FM/SSB). Waterloo area sprouting new interest with KØWOW, WAØINC, WBØQDV and others active.

WISCONSIN

144.340 and 147.57 Mhz. are used for ATV coordination. Signals on 436 and 439.25. Greater Milwaukee area ATV'ers include WB9RYL, WB9RYH, WB9RYI, W9BQD, WB9RYM, W9ZAR, WA9HOH, N9BMH, W9WAW, K9KLM, KC9CK. Schedules run on Saturday mornings to Illinois and south. Polarization is horizontal exclusively. Need reports!

MISSOURI

Activity in St. Louis is starting to pick up say's Dave Williams WBØZJP! WDØFCH, WB9TRP and WA4YWZ will be on shortly. I am working Chicago ATV'ers quite often with my best contact with WB9CGZ Joe two-way Color and sound at P-5 quality on Sept. 5th 260 miles! Looking forward to more St. Louis and Missouri ATV activity.

MINNESOTA

Art Londale KAØJLB reports good activity in the Minneapolis/St. Paul area with a combination vertical/horizontal polarization being used for ATV at 439.25 Mhz. Active ATV'ers that can be seen nightly are WA9NJR Ron, WDØFUV Mike and KKØO Jay. KKØO was on about 15 years ago and has renewed his activity lately. Any other Minnesota ATV activity?

TEXAS

For the Lone-Star state, ATV activity is poorly reported to us. Lets get some reports into A5! Mark Schiebl WB5HVB reports reception of W5PZP in color and Stan W5FQQ in Baytown (near Houston) is getting active. W5PZP bought a PC Repeater setup and will be on this fall with an ATV Repeater for the greater Houston area. A "fantastic" newsletter was published by W5VMD lately with alot of great ATV information including an up to date ATV state directory. Stations known active by A5; K5QY, W5KPZ, K5ARG, W5RLG, W5EUM, KB5WJ, N5FP, KA5JDP, W5VMD, WB4GHY and WA5EDK. What's happening in your part of Texas?

NEBRASKA

It's building! say's Frank WAØIWF (Rohner fan). Active stations use the 146.67 (-600) Mhz. FM repeater for ATV coordination. WØUVU, WØWR, WBØIEV and WBØIEN also active at 439.25 Mhz. Horizontal polarization is being used primarily in the state.

OKLAHOMA

Well known ATV'er Warren Weldon W5DFU of Tulsa, Oklahoma reports great FSTV activity even through a 78 mph. windstorm in April that bent his 88-element J-Beam array over. Active stations at 439.25 Mhz.; W5DFU, W5HDS, K5KW, WA5QDZ, WA8KPY, W5HTZ, K5CFM, N5TM and KA0BDQ. Out of 9 Tulsa stations on ATV, 7 use 88-element J-Beams with 2 using 20 element colinear arrays. Warren tries to checkin each Saturday on the 7.290 Mhz. ATV Net conducted by W9ZIH but propagation is getting worse as the summer season passes. Warren is the founding father of the "Old Friendly Amateur Radio Television Society (Old FARTS)". He was also guest speaker at the midwest UHF TV conference in Peoria in September.

NEVADA

Yes, it's not all gambling casinos and large hotels! Frank Perry reports from Las Vegas that there are 23 now on ATV out there in the desert! W6ORG recently made a trip out there and met with some of the ATV'ers. 434 Mhz. is used with a 434/1296 repeater system in the works using a station master antenna. Just think, Wayne Newton...Live on ATV!

CALIFORNIA

The most populas state for ATV'ers has all kinds of activity. Readers should subscribe to the fine Southern California ATV Newsletter for exact activity and happenings. New elections were held and it appears a breath of fresh air has renewed some interest out west. W6RVP is the new publisher of the Club's newsletter and it looks great! Recent updates; Bob Kneebone finally got a TV transmitter, Doug K6KMN is sending out great color from the high desert, K6IUP is receiving only and enjoying, WA6SVT-W6KVC and WB6VVV went up to Crestline and transmitted video on 1278 Mhz. closed circuit repeating of WA6BRI in Victorville, W6LLN seems to be the ZIH of California with an 80 foot tower and a rumored KW coming on ATV, K6TEE is "melting" loop yagis, WA6BHF and W6CCL worked 434 simplex to WA6JCG, WB6ROP and WA6KIN. WA6ZVE is working on an ATV repeater for the San Fernando Valley, WA6SVT will match dollar for dollar for any repeater contributions, W6ORG having repeater supportter problems. There averages 20 ATV'ers who check in on the Monday night ATV Net in San Diego at 8 pm. Keep up the good work out there, fellas and gals!

YOUR STATE?

Didn't see any activity reports for your state or are we missing your call? Let us know what is happening in your area. Another ATV activity update is being planned for our December 1982 issue. Give us the facts and we will surely print them in A5 MAGAZINE! Thanks to all who reported!



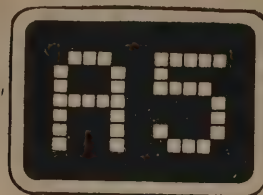
W9LII Tom Barbour, Pekin, Ill.



WA9HOH Richard Kehl, Racine, Wisc.



"OFFICIAL" P-CODES (AND E CODES) FOR AMATEUR TELEVISION OPERATORS



P-0	NOT USEABLE, PICTURE LOST IN NOISE
P-1	LIMITED USE, OBJECTIONABLE NOISE, SOME RECOGNIZABLE DETAILS
P-2	PASSABLE, HIGH NOISE LEVELS, LOCKED SYNC AND FAIRLY RECOGNIZEABLE
P-3	FAIRLY GOOD, NOTICEABLE NOISE, GOOD SIGNAL STRENGTH, LOCKED SYNC
P-4	GOOD, SLIGHT NOISE VISABLE, GOOD GREYS, STRONG SIGNAL STRENGTH
P-5	EXCELLENT, CLOSED CIRCUIT PICTURES, NO NOISE VISABLE

THOSE WERE THE OFFICIAL "P" CODES. LISTED BELOW, ARE THE OFFICIAL "E" EXCUSE CODES COMMONLY HEARD ON THE UHF AIRWAVES FOR "POOR" VIDEO PICTURES. ARE YOU GUILTY OF ANY OF THESE? IF SO, HERE ARE SOME DESIGNATIONS TO GET THAT MESSAGE ACROSS QUICKER;

OFFICIAL AMATEUR TELEVISION "E" (EXCUSE) CODES

E-1	STANDBY, LET ME GO OUT AND SEE WHERE MY ANTENNA IS POINTING TODAY
E-2	LOOSE CONNECTIONS, FLAKY SOLDERING, IMPROPER DESIGNS
E-3	CAMERA WAS NOT TURNED ON, SORRY
E-4	NOT RECEIVING YOUR PICTURES CAUSE MY TRANSMITTER WAS ON
E-5	POOR LIGHTING CONDITIONS
E-6	DARN VIDEO TAPE RECORDER IS NOT WORKING RIGHT
E-7	NOT ENOUGH POWER SUPPLY VOLTAGE, WILL WORK ON IT THIS WINTER
E-8	AMPLIFIER IS GETTING TOO HOT, WILL HAVE TO GET A FAN SOMETIME
E-9	SORRY, HAD THE "STANDBY" SWITCH ON
E-10	NOW ON A LOW-GAIN ANTENNA, HOW COPY?
E-11	PICTURE IS ROLLING AND DON'T KNOW WHERE TV VERTICAL CONTROL SWITCH IS
E-12	WATER IN N-CONNECTORS
E-13	HARDLINE CABLE IS SO EXPENSIVE AND TOO HARD TO GET
E-14	LOTS OF LEAVES ON TREES HERE, WILL TRY AGAIN THIS FALL
E-15	LOTS OF JUMPERS AND WRONG TYPES OF CONNECTORS IN ANTENNA LINE
E-16	DON'T KNOW MY OUTPUT POWER, CAN'T AFFORD A WATTMETER
E-17	DON'T GET A-FIVE MAGAZINE
E-18	JUST HAVEN'T BEEN ON LATELY, HAS THE BAND BEEN OPEN?
E-19	DIDN'T CATCH BAND OPENING, SLEPT LATE
E-20	BAND MUST NOT BE IN GOOD SHAPE TODAY

IF YOU HAVE USED FIVE OR MORE OF THESE "EXCUSES" DURING YOUR ATV OPERATION, YOU HAD BETTER "GET YOUR ACT TOGETHER". THIS IS SIMPLY TO POKE A LITTLE FUN AT SOME OF THE THINGS YOU HEAR DAILY ON VHF/UHF AUDIO FREQUENCIES ACCOUNTING FOR "POOR" VIDEO TRANSMISSIONS. TRUE, SOME CAN BE LEGITIMATE EXCUSES, BUT MORE OFTEN DO THESE FRAIL EXCUSES TURN INTO BECOMING MAJOR OBSTACLES IN ATV OPERATION. "DON'T DISPAIR, FIND WAYS TO SOLVE THE PROBLEMS AND TAKE ON THE ATV "CHALLENGE"!

ATV XMTR — VHF engineering TVX-10 schematic needed. WA3HJC, Lee Robinson, 317 Peninsula Drive, #53, Erie, PA 16505.

Reports in *Westlink* indicate that cable TV (CATV) operators around the nation are facing increasing resistance to their use of cable channels "E" (145.25 MHz) and "K" (223 MHz). In particular, the following recent actions have taken place:

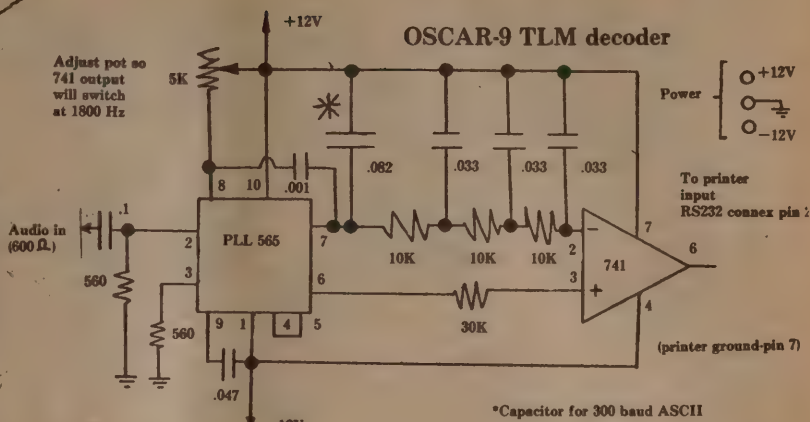
- Storer Cable TV, Thousand Oaks, CA, gave up use of channel "K" following efforts lead by Mark Gilmore, WA6RHK, and the members of the Condor Repeater Association.

● Teleprompter Corporation faces opposition from amateurs in Torrance, CA, regarding their use of channels "E" and "K." Here, the fight is being led by members of the Hughes Aircraft Company's Amateur Radio Club.

● Cablevision Corporation, Lincoln, NB, may be forced to vacate channel "E" if the City Council takes the advice of the Cable TV Advisory Board in that city.

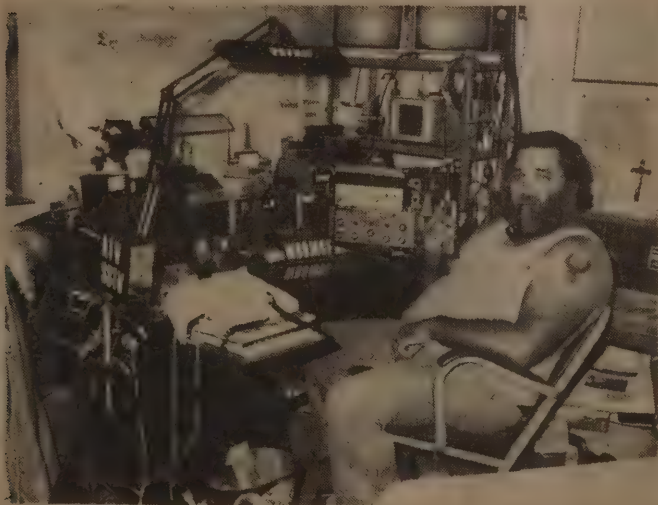
The direction is clear . . . if amateurs are going to protect their v.h.f. bands from r.f.i. produced by leaky CATV systems, coordinated moves will be required to eliminate CATV operations on channels "E" and "K." And the time to make such moves is during the local planning process, before the CATV franchise is awarded.

Finally, amateurs should not forget that operations on CATV channels "UU" (421 MHz), "VV" (427 MHz), "XX" (439 MHz), and "YY" (445 MHz) pose a threat to our 420-450 MHz u.h.f. band.



Clear channel

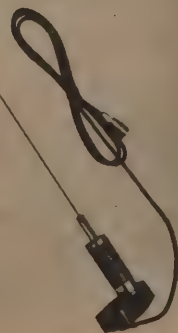
The first successful long distance demonstration of television took place in 1927 with a broadcast between Washington, D.C., and New York City.



Ron Preibe WB9MCF, Illinois, during A5 August FSTV contest. Ron racked up 1,955 points on ATV-DXI

UHF Amateur antenna

Hustler, Incorporated has announced a mobile trunk lip-mount collinear antenna for 438-450 MHz Amateur service. Model BBLT-440 has a unique 5/8-wave design that develops a 5 dB gain, compared to a quarter wave stub, and features a 10 MHz bandwidth with under 2:1 VSWR.



The moisture-sealed impedance transformer features silver plated base to coil contacts and 15 feet of ultra low-loss coaxial cable with connector.

For additional information, write Hustler, Incorporated, 3275 North B Avenue, Kissimmee, Florida 32741.

September 1982

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P50VD	50-54	<1.3	15	0	DGFET	\$29.95
P50VDG	50-54	<0.5	24	+12	GaAsFET	\$79.95
P144VD	144-148	<1.5	15	0	DGFET	\$29.95
P144VDA	144-148	<1.0	15	0	DGFET	\$37.95
P144VDG	144-148	<0.5	24	+12	GaAsFET	\$79.95
P220VD	220-225	<1.8	15	0	DGFET	\$29.95
P220VDA	220-225	<1.2	15	0	DGFET	\$37.95
P220VDG	220-225	<0.5	20	+12	GaAsFET	\$79.95
P432VD	420-450	<1.8	15	-20	Bipolar	\$32.95
P432VDA	420-450	<1.1	17	-20	Bipolar	\$49.95
P432VDG	420-450	<0.5	16	+12	GaAsFET	\$79.95

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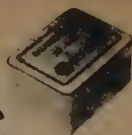
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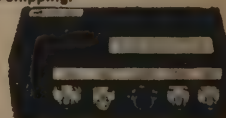
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The Care and Feeding of Linear Amplifiers for ATV



Your amplifier doesn't like to be fed ATV signals? Careful grooming will give it a healthy appetite for this delectable mode!

By Tom O'Hara,* W6ORG

REPRINTED WITH PERMISSION FROM QST MAGAZINE, AUGUST 9TH 1982

BY LAIRD CAMPBELL, W1CUT (MANAGING EDITOR, QST MAGAZINE) ARRL

The increased availability and affordability of video equipment has helped account for the growing number of fast-scan ATVers. Microcomputers, video cassette recorders, color cameras, and video Teletype and cw converters have encouraged hams to want broadcast-quality, real-time pictures. Just receiving a snowy, black-and-white call-letter plate from 40 or more miles away is "old hat." Emphasis today is on getting good-color, snow-free pictures with which to play computer games, coordinate public-service events, or show the latest home movies or videotapes.

Once your 10-watt ATV station is working well, and all the antenna and tower height the wife and neighbors will allow have been put up, thoughts turn to more power. This article covers trade-offs between transistor- and tube-type amplifiers, gives test results of three popular transistor amplifiers, and discusses system considerations to enable you to decide which suits your needs best.

Tubes vs. Transistors

What is the difference between a tube amplifier and a transistor amplifier? Watts are watts, aren't they? Well, if you are using fm or cw, it may not matter. With ATV you need to reproduce the video without degrading the linearity, video-to-sync ratio, or bandwidth (to the point of poor contrast), tearing or jittering, or lack of sound and color. With a-m, the choice of amplifying device must

be made with these characteristics in mind, or results can be disappointing.

Let's consider bandwidth first. Uhf power transistors are low-impedance devices (input and output impedances are often around 1 ohm), while tubes have much higher impedances, in the thousands of ohms. This high impedance dictates input and output loaded Qs that limit bandwidth. It also determines the level of sound and color subcarriers, and resolution. Transistor loaded Qs are often below 10 because of the relatively high resistive- to reactive-component ratios. These values determine the matching-circuit strip-line dimensions. Tubes, on the other hand, usually have high grid capacitance and lead inductance — the limiting factor in the values used to make a resonant circuit at 400 MHz. Grid Qs can end up being more than 75 in tubes, such as the 4X150, with all the matching tricks normally employed. In tube amplifiers of this kind, the grid is the major killer of resolution, color and sound. For this reason, many hams end up using their 10-W ATV rig as an rf driver and adding a high-power video modulator.

Linearity is a factor that enables tubes to fare better than transistors, so a trade-off is often considered between bandwidth, (favoring transistors) and linearity (favoring tubes). Tubes are linear up to the abrupt point of limiting in Class C operation, so you can expect good gray scale and little reduction of sync. With transistors, input-to-output gain varies greatly, depending on the power-output level. Generally, the last 3 dB of output

increase takes more than 6 dB of input increase. Many hams like this characteristic for ssb because the soft limiting effect gives a higher average power, termed "talk power." Voice recognition suffers little from the peak distortion, and it does improve the signal-to-noise ratio. With video, you must have the sync to enable the TV set to sweep correctly and give a stable picture. Since the sync tip is transmitted at peak envelope power, a transistor power amplifier can compress the sync amplitude to half or less, giving a jittery, torn or rolling picture in the TV. A rule of thumb for using power transistors in the linear mode is to set the peak envelope power at half the manufacturer's rating. For instance, a Motorola MRF648 is rated at 60 W and should be run at 30-W PEP for ATV.

I ran tests using a video-processor amplifier, which enables setting the sync-to-video ratio at any level. Among six TV sets tested, all would lock up with the sync level cut in half. So, as a minimum, set 50% sync compression as the worst case, or 20 IEE units out of 40. This varies with each TV model and assumes the camera is properly set with 40 IEE units of sync and 100 units of video. More than 50% of rated PEP can be obtained by use of sync expansion, but more on that later.

Kilowatt ATV

Before we turn to the three tested transistor amplifiers, a discussion of one of the popular tube amplifiers is in order. The K2RIW KW amplifier¹ is available in

*ARRL TA, Fast Scan ATV, 2522 Paxson La., Arcadia, CA 91006

¹Notes appear on page 28.

kit or complete form from ARCOS.² On cw, 10 W of input power from my P. C. Electronics TC-1 transmitter/converter (with no video applied) gave 325 W of output power. The only change I could see in this amplifier over the original K2RIW design was that, rather than the original 4CX250s, the tubes are now Eimac 8930s (100 watts more dissipation each). I stopped testing at 450 watts out (14 watts of drive) because the coaxial cable to my dummy load got very warm to the touch after a few minutes.

The grid loaded Q caused the 4.5-MHz sound subcarrier to roll off 11 dB in the linear mode. Color was almost nonexistent, and the resolution of the 10-W ATV transmitted signal was gone. There is a simple way to overcome this deficiency. With a P. C. Electronics VM-2 grid modulator, the grid loaded Q does not restrict the transmitted-video bandwidth. This leaves only the plate circuit loaded Q to roll off the response.

The modulator was put into a chassis and mounted to the side of the amplifier, as shown in the lead photo. A P.C. Electronics FMA5 sound subcarrier board is mounted in the covered box. A short piece of RG-174/U cable connects the modulator with the amplifier grid circuit. Best results were obtained with -65 V grid bias and no video applied. The modulator is clamped to the video sync so that, regardless of what is in the picture or the average picture level, the power level at

the sync tips remains constant. With the 10-W drive, I got 325 W of output power, and then added video. I measured about 250 W of output after adjusting the video gain for best contrast, just above white limiting. The average power on the wattmeter will change, decreasing for a predominantly white picture and increasing for a principally black picture, but the peak envelope power will remain constant at 325 watts.

Amplifiers are best compared by stating PEP, because this eliminates modulation type as a factor. With clamped or de-restored video modulators, this is as easy as removing the video and reading the power directly from a wattmeter. I will state power as PEP, or power as read on a wattmeter with no video modulation applied. The wattmeter will read PEP in the cw case (no modulation) with a clamped video modulator.

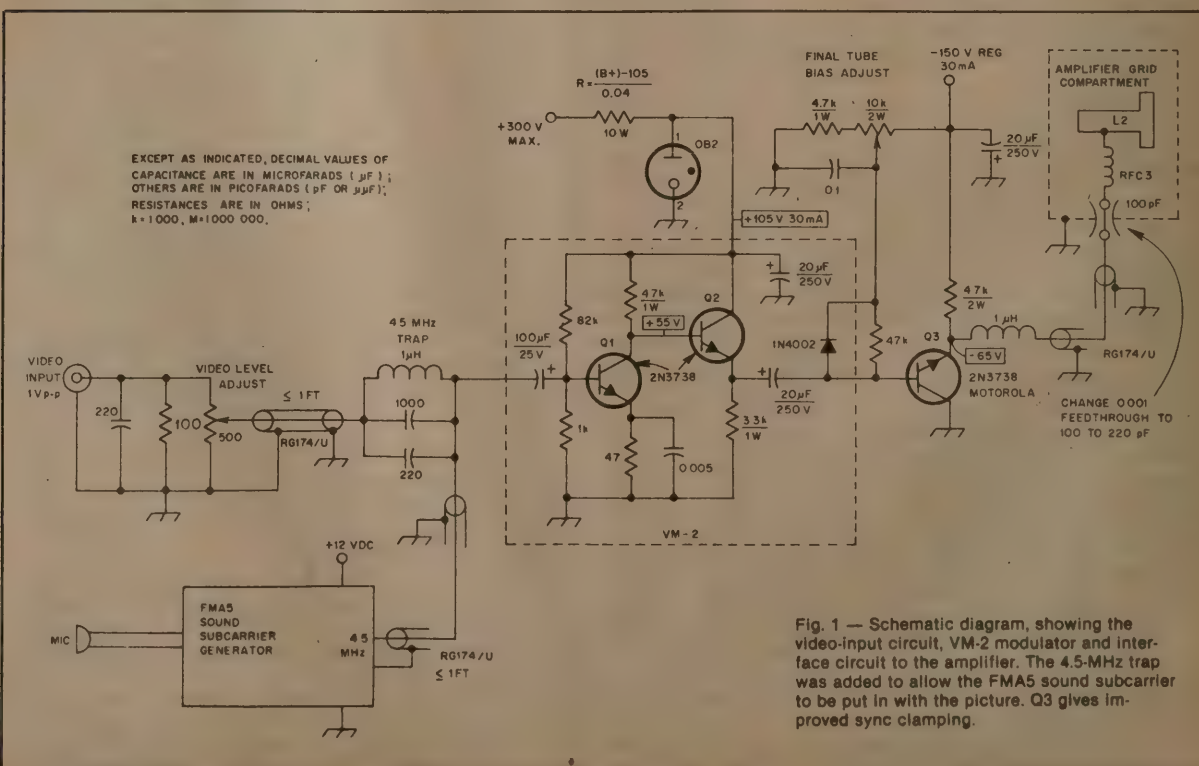
Fig. 1 shows how the P. C. Electronics VM-2 modulator is connected to the K2RIW/ARCOS amplifier. Q3 was added for improved clamping and linearity, and to set the bias point. The plate Q is still high enough to warrant fine adjustment of the plate and output tuning to the high-sideband side of the response. The roll off is just about 1 to 2 dB at the sound subcarrier, and can easily be compensated for by a little extra 4.5-MHz injection. Color is down about 1 dB and is not degraded noticeably except in weak reception cases. Resolution is great, with the TV set i-f

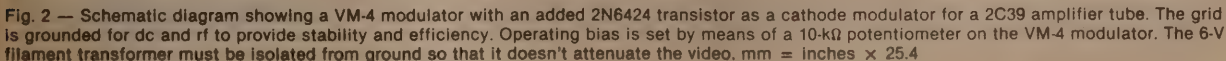
bandwidth being the limiting factor (most are only 3 to 3.5 MHz). A resolution rule of thumb is 75 to 80 lines per MHz. I let this amplifier run for 1/2 hour continuously at 325-W PEP, and it seemed to be loafing. So, for a really strong signal, I can recommend this unit, but suggest high-level modulation for quality video work.

50-Watt Triode Amplifier

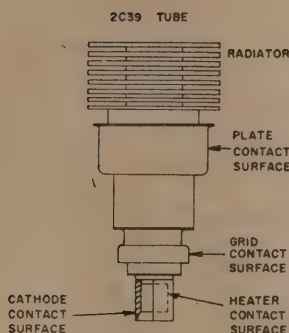
The old faithful 2C39 (and newer variations) also makes a good linear amplifier. These tubes can give full bandwidth in grounded-grid operation if the plate line is modified to a half-wave section. All cavities have a loaded Q that is much too high for good bandwidth, if they are 1/4-wave lines. They are physically very short because the internal capacitance of the tube is high. Again, this limits the resulting Q that can be achieved without loading the tube down so far as to make the stage gain too low.

The flat plate line (1/2-wave circuits) allows a much lower loaded Q, seems to work better, and is quite simple to build. You can tell a 1/2-wave line from a 1/4-wave line by the tuning capacitor placement. The 1/4-wave line capacitor is placed next to the tube plate and resonates with the tube plate capacitance. The 1/2-wave line has the tuning capacitor at the end opposite the tube, and usually the B+ rf-choke connection is near the middle of the line.





The other side of the coin is poor linearity. If you look at the input-power versus output-power curves of some of the popular uhf power transistors (Motorola RF Data Manual, for example) you will notice that the curve bends quite a bit, especially as the maximum-power point is reached. This nonlinearity will cause gain compression at the high-power end of the



Broadcast TV transmitters often have linearity-adjustment circuits in their modulators to compensate for any

There is the effort and special considerations for mounting the box on the tower, but there are always practical trade-offs for improved performance. The amplifier will have to be mounted in a weatherproof aluminum box with a 13.8-V regulated supply. Even though the heat given off is lower with ATV, the amplifier will have to be silicone-greased

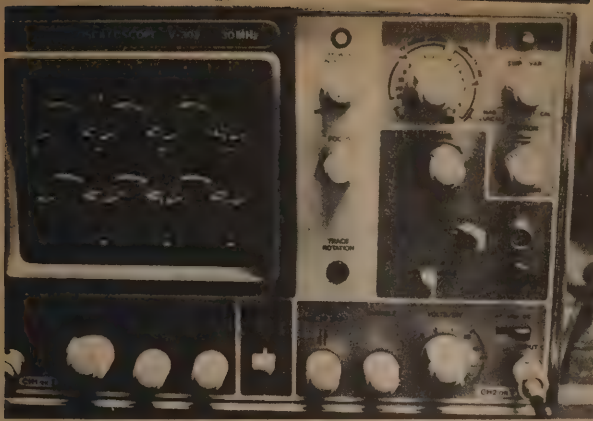


Fig. 3 — Oscilloscope used to observe the video waveform. The lower trace is the video signal as it comes out of the sync stretcher. The upper trace is the signal from the Mirage D1010-N amplifier.

and mounted against the aluminum box. Use the rule-of-thumb temperature test! After the amplifier has been on a few minutes put your thumb on the heat sink. If, after gritting your teeth, and with tears forming in your eyes, you can hold your thumb on it, it will probably be okay. The power supply should also be tested for temperature rise, but aluminum angle brackets and direct mounting should do it. If running 117-V ac up the tower bothers you, try running the 20-V ac at 8 A between the power transformer in the shack and the bridge rectifier and regulator at the amplifier.

Why does the power supply have to be right next to the amplifier for ATV? Most regulated power supplies are designed for presenting a low impedance at the terminals, with good line and load regulation for 120-Hz ripple. With a-m, the load varies at the modulation rate. This amplifier draws 8 A at 13.8-V dc during sync pulses and at maximum signal levels, but draws only a few hundred milliamperes for the white level. It would not be so bad if we only transmitted vertical blanking pulses 60 times per second, because the big filter capacitors, regulator devices and time constants do a good job at these frequencies. But the current changes at video rates up to 5 MHz. The larger the filter capacitance, the higher the impedance at any given frequency above the audio range. This is caused mainly by the internal inductance and by what is called "equivalent series resistance." Add to that the small but significant resistance and inductance in the leads between the amplifier and the power supply, and a scope on the B+ supply at the amplifier will show a few volts of ripple that look like horizontal sync and video.

This ripple is another cause of sync compression, besides the normal gain curve of the uhf power transistors. Consider that the gain of the transistor is going to be much lower if the ripple com-

ponent on the 13.8-V line swings down as much as 2 V to 11.8 V during the horizontal sync pulse. There are two ways around this problem; both things should be done, if possible. The only capacitors in the amplifier are for low-frequency stability in the uhf power transistors. They usually consist of a good quality bypass for 450 MHz, a 0.1- or 0.01- μ F unit for the vhf frequencies and a 22- μ F unit for hf and lower frequencies. But these won't do a thing for frequencies between 3 kHz and 500 kHz. Before I added 100- μ F and 470- μ F capacitors (25 V), the circulating current in the Mirage amplifier was too much for the 22- μ F unit after 10 minutes of continuous video at 90-W PEP. Next, the power leads should be as short in length and as large in wire size as possible to ensure a good regulated supply. Anything over 3 feet (1 m) may be too long, so building a supply next to the amplifier is ideal.

Test Setup

The test setup consisted of a P. C. Electronics TC-1 Transmitter Converter with the sync stretcher built into the TXA5 exciter modulator, a DM-1 rf demodulator to sample the driving video waveform, a Bird Model 43 Thruline wattmeter with a 25-W, 400- to 1000-MHz slug and the amplifier under test. Also included were another DM-1 to sample the high-power video waveform and a Bird Teraline wattmeter with a 100-W, 400- to 1000-MHz slug and dummy load (Fig. 4). The sound subcarrier was shut off to display a clear video-only waveform on the dual-trace 30-MHz scope.

To set up any amplifier without a scope or a DM-1 demodulator, try this procedure:

- 1) Add the sync-stretcher parts to the TXA5 exciter, or the P. C. Electronics SS-1 sync-stretcher board to your transistor modulator.

- 2) Remove all video from the

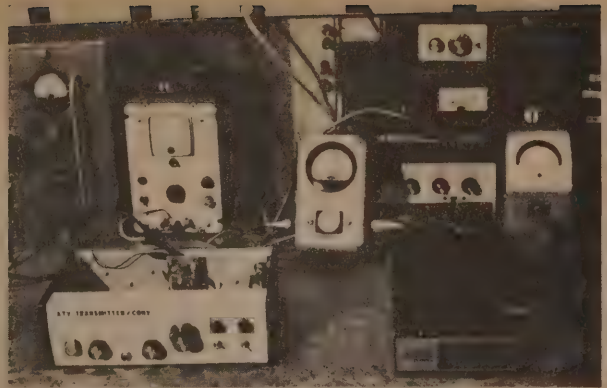


Fig. 4 — Setup used to test the three transistor amplifiers. Shown left to right is a TC-1 transmitter/converter with a DM-1 detector/monitor to sample the sync-stretched waveform, a Bird 43 Thruline wattmeter, the amplifier under test, another DM-1 inline to monitor the output waveform, and a Bird Teraline wattmeter/dummy load.

modulator input. The sync stretcher will put out sync if the video is still connected but turned down. Also, turn the 4.5-MHz subcarrier injection-level potentiometer to minimum.

- 3) Rotate the bias potentiometer, which controls the clamped FEP power output, to minimum (fully ccw).

- 4) Turn on the amplifier and the transmitter. Slowly rotate the bias control until just reaching the suggested PEP output for best ATV operation.

- 5) Now, the video can be reconnected and the video gain can be increased slowly for the best picture. Turn the sync-stretcher control cw for a good, stable picture. For most amplifiers this is fully cw or within 10 degrees of full rotation, and there is some interaction with the video-gain control. Turn the 4.5-MHz subcarrier-injection potentiometer back to the original position.

Linear, full-bandwidth, a-m video requires a little extra care and consideration. Whether you select a tube or a transistor amplifier to throw your pictures farther and clearer, I hope the results of these tests will help you achieve good, stable video.

My personal thanks to Mel Farrer, K6KBE, at KLM; Ken Holladay and Everett Gracey, WA6CBA, at Mirage; John Beanland, G3BVU/W1, at Spectrum International; and Fred Merry, W2GN, at ARCOS. The loan of their off-the-shelf amplifiers made this study possible.

Notes

¹R. Knadle, Jr., "A Strip-Line Kilowatt Amplifier for 432 MHz," *QST*, April 1972, pp. 49-55 and May 1972, pp. 59-62.

²ARCOS, P.O. Box 546, 35 Highland Dr., East Greenbush, NY 12061.

References

Rusgrove, J. and G. Woodward, eds. *The Radio Amateur's Handbook* (59th edition). Newington: The American Radio Relay League, Inc., 1981.

A good continuing source of ATV information is A5, P.O. Box H. Lowden, IA 52255.

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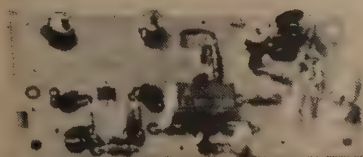
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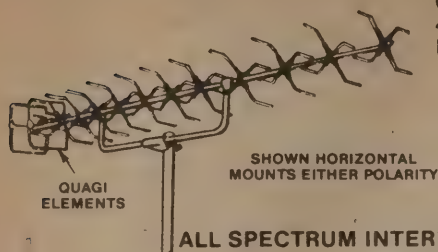
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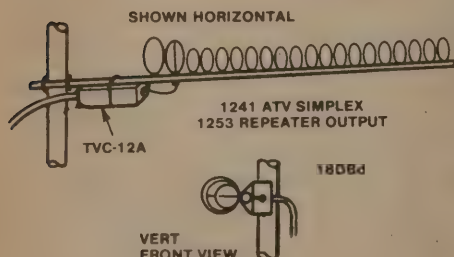
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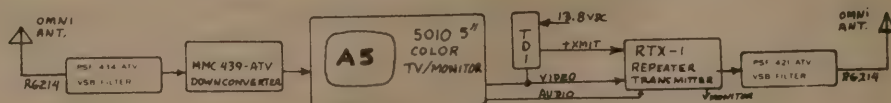
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5 mHz bandwidth for good color and sound but rejection for no desense. Copper plated 7 pole for typ 1.3db insertion loss.

MMC439-ATV CRYSTAL CONTROLLED DOWNCONVERTER ch3 IF ...\$78.45 ppd
45.75 mHz IF 83.45 ppd. Low noise MRF901. 30 db gain.

5" LIBERTY MODEL 5010 PORTABLE COLOR TV/MONITOR.....\$299 ppd

TD-1 TONE DECODER. Detects horizontal sync to key xmtr..... pc board \$5.

RTX-1 ATV REPEATER TRANSMITTER MODULE\$325 ppd
Contains sync equalized TXA5 exciter, FMA5 sound subcarrier, MHW710-2 10 watt power module, and DM-1 Detector/Monitor in a shielded diecast aluminum box.



SEND SASE FOR COMPLETE REPEATER INFO including ready to go ATVR-4 for \$2499, adding special effects, mixing two meters, getting rid of desense and interference from other transmitters at the same site, etc.

SPECIALS AND NEW ITEMS

WHAT IS THE TOTAL COST FROM US TO GET ON ATV IF ALL U HAVE IS A TV SET????
Not much different than any other mode! WE CAN GET U ON FOR \$699!

CHECK THESE DELIVERED PACKAGE DEALS:

TC-1 ATV TRANSMITTER CONVERTER plus the following:

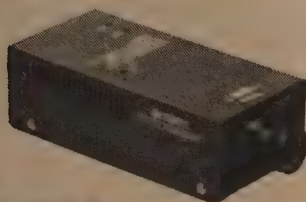


TC-1

- *10 Watts Output
- *Standard Frequencies Available
- *Broadcast Standard Sound
- *High-resolution & color video
- *Regulated AC Supply Built In
- *Tuneable Downconverter & Preamp

1. HV-62 B&W camera, 100 ft Saxton 8285 coax, 48 el J Beam ant. Reg \$719 value.....\$699
2. GP-41 Hitachi Color camera, 100' 8285 coax, 48 el J Beam ant. Reg \$1010 value.....\$990
3. 100' 8285 & 48 el J Beam. Reg \$520.....\$505
4. 48 el MBM48/70 J Beam ant. Reg \$479.....\$469
5. HITACHI HV-62 B&W camera. Reg \$598.....\$584
6. GP-41 Hitachi Color camera. Reg \$889.....\$869

With any of the above 6 packages, order any of the TC-1 options listed at the regular price & receive the new ATV book by A5 Magazine free!
Add Mirage D1010N amp & get free \$20 setup!



HITACHI HV-62U BLACK AND WHITE CAMERA\$205ppd

High performance CCTV camera great for ATV or surveillance. 500 line resolution, 10,000:1 auto light compensation. C mount 16 mm F1.6 lens included. 117 vac at 7 watts. small 4 x 2.7 x 8 inches.

HV-62SU externally syncable, 2:1 interlace version.\$299ppd

WIDE ANGLE LENS HF-9A 9mm F1.4 C-mount\$75ppd

TELEFOTO LENS HF-35A 35mm F1.7 C-mount\$75ppd

ZOOM LENS H5X14C 5:1 14-70mm F2.0 C-mount\$204ppd



GP-41D

HITACHI GP-41D TRI-ELECTRODE

PORTABLE COLOR CAMERA.....\$490ppd

6:1 power zoom 14-84mm, auto iris, F1.6 lens with macro focus for close-ups. 1.5" electronic viewfinder. Boom microphone. Full range variable color temperature control. Superior color and low light sensitivity to 75 lux. 12vdc (6.7 watt load) to 117vac adaptor, AP-4 NC



D1010

D1010-N MIRAGE ALL MODE 100 WATT AMPLIFIER....\$299ppd

420 to 450 mHz, FM, SSB, CW, and ATV. Up to 90 watts pep on ATV with only 4 watts drive. Req. 13.8 vdc reg. at 20 amps. Uses "N" connectors. 12" x 3" x 5 1/2". Specially modified by us for ATV. UG21 male N conn.\$5



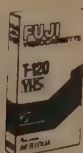
TVX-1 TELEVISION TRANSMITTER\$500ppd

This is a complete 10 watt UHF TV transmitter in a 3 1/2" high 19" rack panel intended for community television outside the USA or ATV in USA. Takes baseband video and line level audio input from a TVRO, VCR or camera. Also a mic input for voice overs. 117vac 60 hz supply. Video monitor output. 4 to 6 week delivery depending on frequency. Standard atv freq 434, 439.25 & 426.25 avail.

UHF TV channel 14 thru 20 (export only)\$600

VHF TV channel 7 or 8 (export only). NEW. CH 3 THRU 6\$750

240vac 50 Hz supply add \$50. 8 Lbs. Call for details.



ATV DEMO VIDEO TAPE VHS format\$25ppd

21 minute running time, shows on the air contacts public service, equipment, voyager 2, etc. If it doesnt get them fired up for ATV nothing will!

TERMS: Unless otherwise specified: Visa and Master Card orders by phone or mail \$25 minimum. Check and Postal Money orders by mail minimum \$25 shipping paid, under \$25 add \$2 shipping and handling. No CODs or purchase orders accepted. In stock items normally shipped within 5 working days after receipt of order with charge card and US Postal money orders. All other checks up to 15 working days to clear. Our ppd prices are sent UPS brown or 1st class mail at our option within USA. Call for additional amount to send if UPS Blue, Express Mail or foreign Air Parcel Post is desired. Foreign orders must include check in U.S. dollars drawn on a U.S. bank. Valid ham call letters required by us for purchase of transmitting equipment for use in USA. Our address is for mail order only. We do not have a retail store for walk-in trade nor its cost to pass on to you.

TOM W6ORG



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Channel 27



"ALL ABOARD TVRO"

PHASED LOCK LOOP AUDIO (A CONTINUING SERIES #8)

By Gerard Wilson, WA6RDA
P.O. Box 241
Glen Ellen, CA

COMPLETE SET ALL PARTS OF A5 TVRO

Series Available for \$3.00
(includes return postage) From WB0ESF
Ralph Wilson 4011 Clearview Drive
Cedar Falls, IA 50613

It has come to my attention that some TVRO enthusiasts building their own satellite system, quits about half way along, only to go out and purchase a commercial unit. Where has the HAM spirit gone? Lack of confidence, Murphy's law, or just plain fear of failure could be the reason. True, the price of commercial units has dropped, but you can't beat the satisfaction of home-brew. I have astounded fellow hams, who have observed the crisp, clear video and stereo sound produced from my home built TVRO. And just to prove how easy it can be done, I built a second receiver from A-5 prints, and used nothing but a VOM and freq. counter for test instruments. The second unit works fine, but I know the 70Mhz board would work much better if I had a sweep generator to align it. The point is, nothing ventured, nothing gained. The learning experience is immeasurable, not to mention the ability to repair it should it fail, or the ability to upgrade the unit as new circuits are developed. This second unit that I mentioned, was peaked for maximum picture quality off the air, and I managed to get quite satisfactory results. It cost me just under \$400 and this included stereo sound and the RF modulator. (LNA not inc.) Commercial units of similar quality still sell for \$800 or more. I tried to impress that some of the circuits will work quite well on perforated PC material, bread boarded accordingly. the following hints may help those who are having difficulty:

1. Parts availability. I have had many questions asked of me regarding where to buy certain items. I must admit the LM 2808 is a hard to find IC. My best advice regarding that audio module is to pass it up and build the Phase Lock Loop instead. It works much better all the way around. Most everything can be purchased from the following sources: JAMECO Electronics, 1355 Shoreway Rd., Belmont, Ca. 94002, 415-592-8097, power supplies, IC's NE564, misc. RIGEL SYSTEMS, 2974 Scott Blvd., Santa Clara, Ca. 95050, 408-727-3628 Riegel makes the best 4ghz bal. mixer for the dollars. DBM-4150A sells for \$69.50 and has better specs than Vari-1 DMB-400. NEWARK ELECTRONICS (many branches) sells Motorola MWA-120 and MWA-320 amplifiers, not to mention connectors, IC comp's, but get order in early on these, for it may take 5 or 6 weeks to get the MWA's. RADIO SHACK sells MRF-901 transistors, many IC's and misc. parts, not to mention a RF MODULATOR for \$9.95 that works super. This modulator is completely discrete and has vestial sideband filter (8 transistors and 5 coils) and couldn't be built for this price. Radio Shack part #277-221 is the best deal. ALASKA MICROWAVE, 4335 E. 5th St., Anchorage, Alaska 99504, 907-338-0340 has MWA amps, piston caps, GasFet's, Mixers, .031 teflon duroid PC material, SMA connectors, and VTO's, to mention a few of the hard to get items, at a reasonable price. They also have chip capacitors. This list should cover all questions asked for part suppliers.

2. P.C. Boards. Most hams know of someone who can make PC boards from the layouts provided. While the graphic clarity from A-5's newsprint is not the best, it still produced satisfactory results. PC board houses will make the boards for you at a nominal cost if you ask them to only print and etch, and not to drill or plate them. A small drill press can drill several at a time using #60 or #80 drills. The 900Mhz I.F. and the LNA are the only boards that must be etched. Everything else could be breadboarded if needed.

3. If you need the modules to be checked of aligned, I will provide this service, if needed, for a small fee. If you have a specific problem, feel free to send a self-stamped envelope stating problem and what steps you have taken, and I will gladly advise a quick reply.

When I first installed my TVRO system, it indeed had problems. But I was building totally in the dark, with little prior experience. I was able to get a picture and sound, and that was a milestone for me. Through the course of the past year, I have tinkered with different parts of the system until I managed to get studio quality video. Most of my mistakes have been omitted and corrected within the A-5 articles. This is not to say that you won't have difficulty, for Murphy still gets around. I did find that as most hams already know, that the secret is in the antenna. I pulled that huge 13' dish off my roof awhile back, and spent several days carefully adjusting each rib. This is where I applied common sense in making sure that there was enough support to withstand heavy winds, and that the curve was as close as possible. I found it was best to install a back brace on every rib, rather than on every other one, as mentioned in the dish article. The one at the top and bottom must be omitted for the interference from the pivot pipe, but the rest of the braces are worthwhile. The carefullness paid off, for my signal is crisp and clear now, on all satellites. Very crude but effective means were used to adjust the dish. This is described in another article. I hope that those who choose to build and enjoy this system, have as much fun as I have had the past several years.

73'
Gerard Wilson
WA6RDA

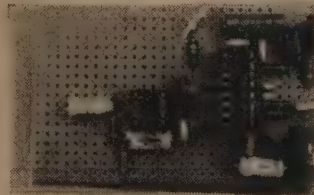
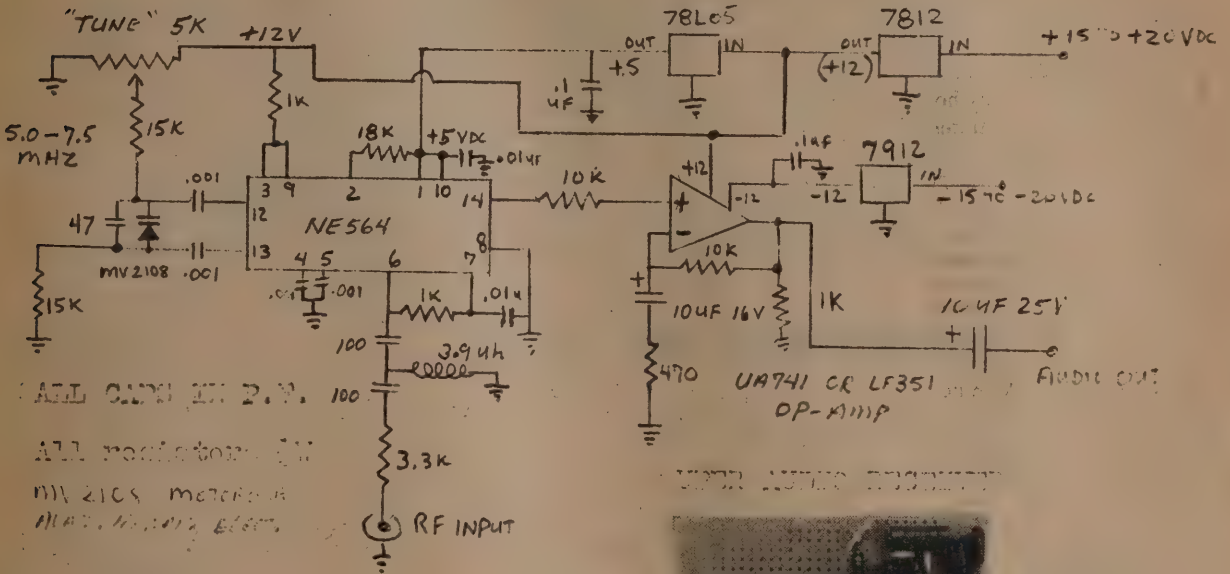
Late entry

Regarding the GasFet transistors, NE21889 can be directly replaced by NE72089, and get same results. NE72089 are \$17.25 each, which means GasFet LNA can now be built for \$100 to make a 45db system. Available from California Eastern Labs, 3005 Democracy Way, Santa Clara, Ca. 95050.

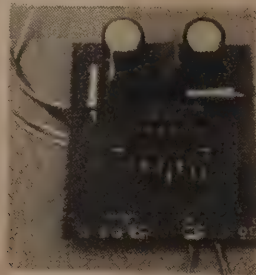
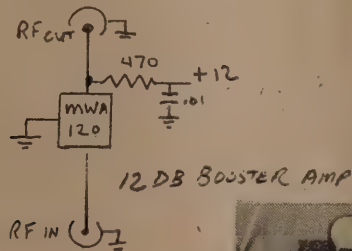
PHASE LOCK LOOP AUDIO

This circuit is much simpler and more effective than earlier audio circuits published. Using a NE564 PLL device, this circuit offers full tuning range plus a bit quieter noise figure than the coil tuned models. Simplicity plus the lack of coils makes this a number one choice. I built two of these units and housed them in a box with a matrix decoder to allow full stereo selection.

If you decide to do likewise, use a switch to select discrete or matrixed outputs, to enable full flexibility. If you find that the audio is a bit scratchy sounding, this probably indicates that the 564 is not getting enough signal. A simple solution is to insert a MWA120 in the RF line to boost sub audio input.



TUNABLE 5.0 - 7.5 MHz



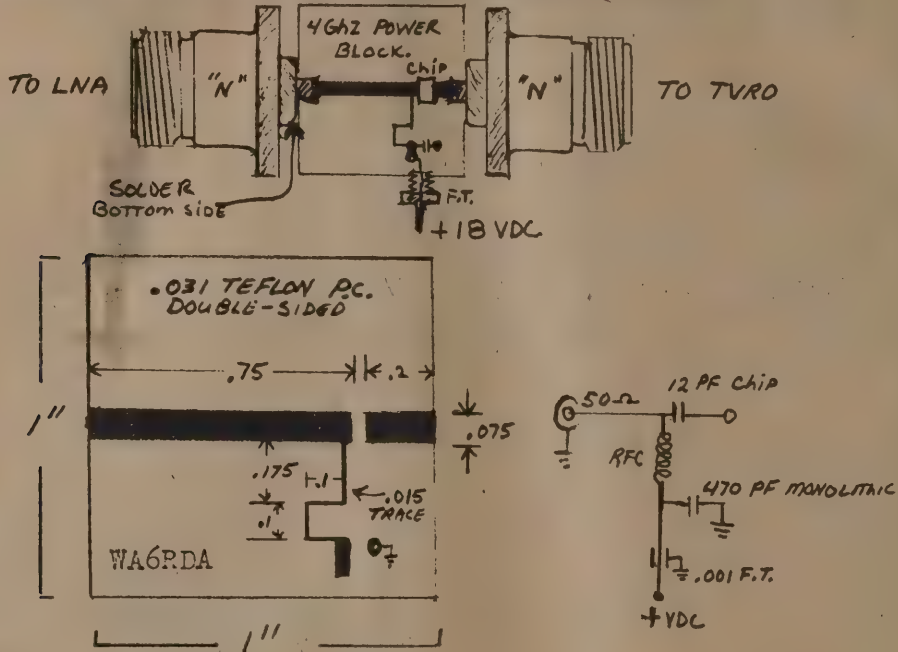
MATIX DECOR

"ALL ABOARD TVRO"

STAELLITE RECEIVER POWER BLOCK

If you plan on using a commercial LNA (low noise amplifier), and your receiver doesn't provide power, or if you are using home brew, this little project will inject the necessary voltage into the coax without degrading the RF. I managed to carve one of these out of .031 teflon PC material, and I substituted .015 dia buss wire and formed it into the configuration shown. A dab of super glue held in onto the PC material. Bottom side of PC material is full foil to provide ground plane. Entire unit should be enclosed into 1 1/4" by 1" box, with a feed-thru cap, as shown. Bottom side of PC should be soldered to N connector at each end. Values other than 12 pf chip cap may be used. Up to 50 pf seems to work ok. This is merely a blocking cap to keep the DC out of the receiver.

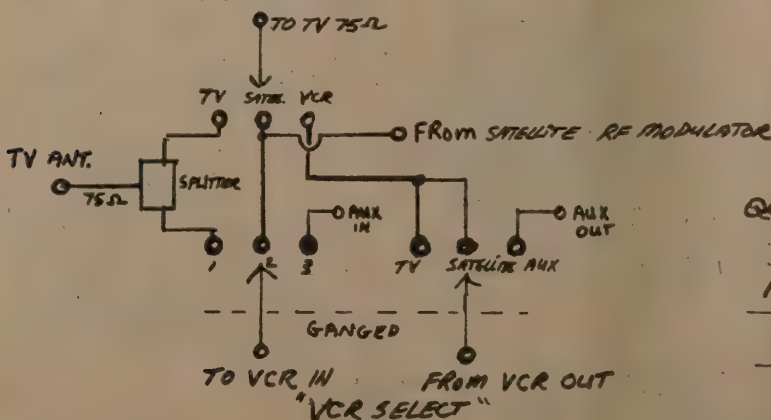
I recommend etching on teflon material, as epoxy glass does not perform well at 4ghz.



When you finally reach the point of frustration from screwing in and out coax cables from the TV, maybe then you will decide to construct this project. This is only one of many possible ways to design this switcher, but it gives the flexibility needed for most situations. The position the switches illustrated, shows the combination in an undesirable mode, for the RF modulator is tied across two outputs. The TV Select should be placed in the VCR position if you wanted to watch the same thing that is being recorded off the TVRO. The purpose of the splitter is so you may record on one channel, while watching a different one at the same time.

I happened to use interlocking pushbutton switches, but rotary should work ok. The switches are mounted next to the connectors, so only very short jumpers were required. Remember, VHF and UHF can be lost easily, so keep leads short as possible.

"TV SELECT"



RF SWITCH BOX

PARTS LIST

QUAN.	DESCRIPTION
1	75Ω SPLITTER
1	SP3T SWITCH
1	DP3T SWITCH
7	TYPE "F" CONNECTORS
1	3"X4" ALUM BOX

22518 97TH AVENUE NORTH
CORCORAN, MINNESOTA 55374

Microwave Band Letter Designation

P Band	.22 - .39 Ghz
L Band	.39 - 1.55 Ghz
S Band	1.55 - 5.20 Ghz
C Band	3.90 - 6.20 Ghz
X Band	5.20 - 10.90 Ghz
K Band	10.90 - 36.00 Ghz
K' Band	15.35 - 24.50 Ghz
Q Band	36.00 - 46.00 Ghz
V Band	46.00 - 56.00 Ghz
W Band	56.00 - 100.00 Ghz

MICROWAVE

- Down Converters
- Antennas
- Systems



Microwave Frequency Listing (MHz)

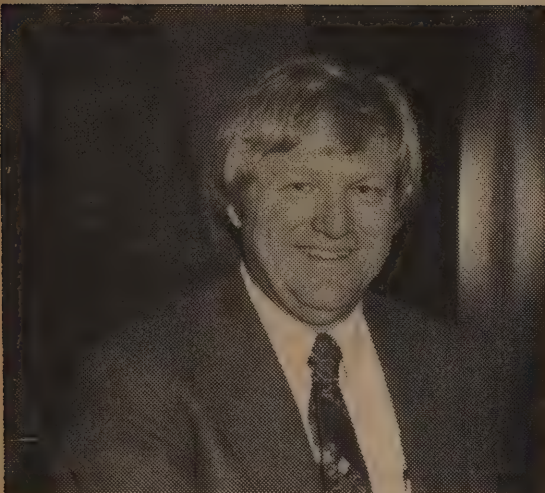
*690 - 1700	Meteorological Satellites	2518 - 2524	ITFS Channel B2
1691.0	GOES Satellite	2524 - 2530	ITFS Channel A3
1694.5	METOSAT Satellite	2530 - 2536	ITFS Channel B3
1700 - 1710	Space Research	2536 - 2542	ITFS Channel A4
1710 - 1850	Government & Armed Forces	2542 - 2548	ITFS Channel B4
1990 - 2110	Studio to Transmitter Links	2548 - 2554	ITFS Channel C1
1990 - 2110	Intercity Relay	2554 - 2560	ITFS Channel D1
2110 - 2180	Public Common Carrier	2560 - 2566	ITFS Channel C2
2130 - 2150	Point to Point, Fixed	2566 - 2572	ITFS Channel D2
2150 - 2180	Omnidirectional, Fixed	2572 - 2578	ITFS Channel C3
2150 - 2156	MDS Channel 1	2578 - 2584	ITFS Channel D3
2156 - 2162	MDS Channel 2	2584 - 2590	ITFS Channel C4
2156 - 2160	MDS Channel 2A	2590 - 2596	ITFS Channel D4
2180 - 2200	Point to Point, Fixed	2596 - 2602	ITFS Channel E1
2200 - 2290	Government & Armed Forces	2602 - 2608	ITFS Channel F1
2205	NASA Space Shuttle, TV	2608 - 2614	ITFS Channel E2
2215	NASA Space Shuttle, TV	2614 - 2620	ITFS Channel F2
2217.5	NASA Space Shuttle, Audio	2620 - 2626	ITFS Channel E3
2267.5	NASA Space Shuttle, Audio	2626 - 2632	ITFS Channel F3
2290 - 2300	Space Research	2632 - 2638	ITFS Channel E4
2300 - 2450	Amateur Radio Operation	2638 - 2644	ITFS Channel F4
2304	Amateur DX	2644 - 2650	ITFS Channel G1
2375	Amateur Television	2650 - 2656	Operational Fixed Service
2400 - 2450	Amateur FM Repeaters	2656 - 2662	ITFS Channel G2
2450	Industrial (Microwave Ovens)	2662 - 2668	Operational Fixed Service
2450 - 2500	Radio Location (Radar)	2668 - 2672	ITFS Channel G3
2500 - 2690	Instructional TV, Fixed	2672 - 2680	Operational Fixed Service
2500 - 2506	ITFS Channel A1	2680 - 2686	ITFS Channel G4
2506 - 2512	ITFS Channel B1	2686 - 2690	Broadcasting Satellite
2512 - 2518	ITFS Channel A2	2690 - 2700	Radio Astronomy

SATELLITE DIRECTORY

NOTE: W-1 (99° W) contains 4 PBS transponders, and o/v continues on W-3 (123° W) F-1 (135° W) and Comstar D-2 (95° W) and D-3 (87° W)

Transponder F2: 119° W Frequency	F3: 131° W Satcom 3	F4: 83° W Satcom 4	W 3: 71° W Westar 3	W 4: 99° W Westar 4	A 2-3: 114° W Anik 2	AB 109° W Anik B	Transponder Frequency
1v 3720		Arts/Nic		BSC	BCTV-TV		1v 3720
2h 3740		PTL	Trans. Lsg.	ABC			2h 3740
3v 3760		WGN	B. Battles	Hughes Sprrs.	CBS		3v 3760
4h 3780		Spotlight	Wnnr-Amx		SIN	Hse. of Commons (French)	4h 3780
5v 3800		Movie Ch.		XEW-TV	SPN		5v 3800
6h 3820		WTBS	Bravo	PBS	PBS	CHCH-TV	6h 3820
7v 3840		ESPN	Escpde/NCN	FNN/Consat	PBS	CBC	7v 3840
8h 3860	WOLD	CBN	CBS	PBS			8h 3860
9v 3880	Ameri. Forces	USA	CBS	Bonneville	PBS		9v 3880
10h 3900		Showtime/W	(RCTV)	PBS	PBS		10h 3900
11v 3920	Alaska Tv	MTV	(RCTV)	CBS Cable	PBS	CBC/No.	11v 3920
12h 3940		Showtime/E		SCPC			12h 3940
13v 3960	NASA	HBO/W	(Cinemax/E)	Select Tv	Group W		13v 3960
14h 3980		CNN			Group W		14h 3980
15v 4000		CNN2	HBO	SIN	Group W	CHLT-TV	15v 4000
16h 4020		HTN/ACSN	(Inner City)		Group W	CBC/French	16h 4020
17v 4040		WOR	TBN	SPN	Group W	CBC/ov	17v 4040
18h 4060	o/v	Galavision	(HBO)		o/v		18h 4060
19v 4080		C-Span	Amer. Sat.	ABC	o/v	CITY-TV	19v 4080
20h 4100		Cinemax/E		Western Union		CBC/English	20h 4100
21v 4120		HTN		WOLD	WOLD		21v 4120
22h 4140		HBO/W-MSN			(Home Music)		22h 4140
23v 4160	Alaska TV	Cinemax/W	(UTV Net)	Eros	(Bonville)	Hse. of Commons (English)	23v 4160
24h 4180		HBO/E			(Hughes)		24h 4180

() - Parenthesis denotes tentative assignment for particular service * - 12 transponder satellite. All polarization is horizontal
o/v - Occasional video/miscellaneous feeds



Clay Abrams K6AEP

MAJOR BREAKTHROUGH FOR TRS-80C

The "true" leader's and pioneers in SSTV today are the one's who design new systems at a much lower cost to Radio Amateurs with compatibility to present or older systems in mind. Clay Abrams is just that sort of guy as his love with micro-processors and programming have brought the computer and the SSTV modes together. For many years, Clay has been writing his own programs for his home built SWTP-6800 system. With the major chip change to the 6809 system by Tandy Corp. (Radio Shack), Clay's expertise became suddenly available in the TRS80C Color Computer to Amateurs. First pictures coming from K6AEP in 1980 revealed quality high-grade pictures with special effects that couldn't be matched by hardware converters. It was just a question of time before Clay had the economical TRS80C up and running on SSTV and

SSTV transmissions received and generated by the computer were commonplace. Present systems have been "hampered" by two problems; 16 shades of greys are transmitted and stored, but only 4 shades are displayed to the user and only 7 distinctive colors are available in the color mode. The challenge of perfecting this already fantastic system was no problem for Clay and this November, A5 MAGAZINE will carry information of a NEW circuit board and software program by K6AEP to be used in conjunction with existing interfaces that will allow not 4, not 8, but 16 shades of grey levels to be displayed, a selectable mode format of 4, 8, 12, 16, 25 second frame clock rates (with a FAX mode coming in the future), an increase from 7 to 296 colors in the color mode which can be sent in the RGB method as well as single frame color. Other additional features are being programmed, but we will let you read it all for yourself in our upcoming special November SSTV Color issue. MULTIMODE Corp. of Texas (WB5MRG) and Clay have working prototype boards now up and running. Experiments with WB9LVI have revealed better resolution than Robot 400 converters in the high resolution modes. Once again, A5 "tips" our hat to K6AEP and praises his openness of designs and low-cost applications for SSTV'ers!



W9NTP RE-ELECTION UNDERWAY

It was great to see a familiar campaign slogan "Elect Don Miller" banner at Indianapolis this year. Don is running for re-election to the 9th ARRL District position that he held previous to a Harry Dannals "temper tantrum" that forced Don to resign from the esteemed office. Quite a rucas was raised about the resignation by Don's supportters which led to a recall balloting in which Don lost by only 300 very questionable votes. Well, that's all in the past-Don appears not to be bitter by the whole affair and new things are happening at the League under the direction of Vic Clark W4KFC and David Sumner KLZZ and Don wants to be part of it once again! Don has contributed so much in the past years to Amateur Radio as well as to the ATV modes in

to what it is today. Don's devotion to the hobby, his volunteer church work with missionaries, his unique work with archaeology and history, his surperb designing and technical accomplishments with the military along with his political commonsense of Amateur Radio, has produced a well-rounded respected individual that his lovely wife Sue, the state of Indiana and ATV'ers can certainly be proud of. A5 ATV Magazine "supports" W9NTP! -QCD

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CCP-101

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 - RTTY/ASCII & SSTV FSK encoder
 - External SSTV mixing
 - TRS-80C video mixing
 - Center frequency tuning indicator

- MODEL CCP-101 SSTV Decoder Module
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Arlington, Texas
76016

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\$44.50

\$ 62.50

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Colorscan 403 kit less color encoder . . . \$520.00

Colorscan 403 color encoder kit (partially
assembled and alligned, less psu \$100.00

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K8N 2G6

World Wide DX SSTV Contest

Our "A5 MAGAZINE" WORLDWIDE DX SSTV CONTEST is now history! 63 entries and logsheets arrived with FM7CD Michel Brunelle of Fort de France, (Mart) winning top scores with 1,622 points! Michel's station consists of a Drake TR7/RV7, Henry 2KD-5, Telrex TB5EM, Hygain 402BA and an 80 meter diapole. Video equipment includes; Robot 400 SSTV Converter, Model 800 keyboard, Setchell Carlson monitor, RCA 2000 Camera and an Akai GXD 650 tape recorder. He reported as most did, very poor conditions-especially on 10 meters. His breakdown in scoring was; 3.8 Mhz. 1-qso, 7.0 Mhz. 1-qso, 14.0 Mhz. 55 qso's, 21.0 Mhz. 10 qso's and on 28.0 Mhz. band 7 qso's. His combination of sending video ID callsigns and "mugshots" earned him a big score on the July 17th and 18th contest dates. A5 MAGAZINE "awards" Michel a big 3-year subscription (worth \$78.00 foreign surface rates) and a "gold" certificate for framing and display in his SSTV "shack". Congratulations Michel and "see" you again next year!

KEY1 HIGH SCORER OF UNITED STATES ENTRIES

KELY Rolf D. Seichter of Tewksbury, Mass. won "first place" in the U.S. category with 5 contacts on 15 meters, 69 on 20 meters, 3 on 40 meters and 5 on 80 meters which gave him a total respectable score of 810 points! Rolf's logsheet (neatly typed out for us) shows 3 contacts with overall winner FM7CD on 3 bands (20-40-80) with 595 reports! Other DX contacts include LULC, VE4ADG, G4MHF, DL7MT, DF9TB, ON7OW, DK2TB, OZ3WP, CE3AUL, PY2OB, ZP5CCG, CX2GB, KZ5A, VE3JW, 8P6NC, VE3KTC and IUE, DF9FP, 4X4VB and others. Almost all SSTV contacts included "mug shots" for extra bonus points. KELY's SSTV station consists of Kenwood TS-830s, SB220 Heathkit linear, Robot 400 converter and various monitors. Our "congratulations" to Rolf and enjoy your 1-year new A5 MAGAZINE subscription on us and proudly display your certificate!

Top Five Scores

1st place (DX)	FM7CD	1622
1st place (US)	KELY	810
2nd place	*VE4ADG	453
3rd place	KB6WP	410
4th place	VE3JW	368
5th place	WD9IPX	331

*(multi-op)

"All entries will receive a gold certificate recognizing their scores and contributions."

Next SSTV Contest; January 83

"Worked All States SSTV"

(details in Dec. issue)

Comments on the A5 SSTV Contest;

"Only worked 11 hours and enjoyed every minute of it!" -VE3JW



KE1Y Rolf Seichter during "A5" SSTV-DX Contest

"A lot of local 80 Meters SSTV activity, but they don't want to work others, color SSTV should not be awarded extra points as it penalizes those of us who don't care for it or can't afford it right now." -KELY

"Contest is too complicated for newcomers, extra points for color, motion and mods are not fair, highest score in each state would be better, keep it simple!" -W2GND

"My first time in a SSTV Contest after 31 years of being a "ham". Bands were poor but enjoyed making contacts I hadn't seen before - let's do it again!" -W4TUQ

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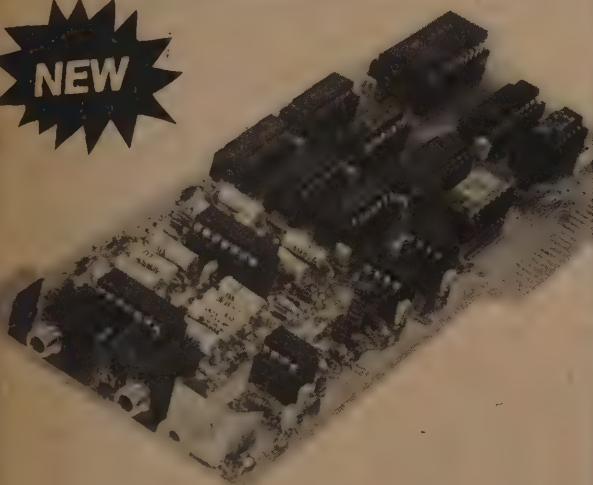
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PhotoCaster requires an APPLE II or APPLE II Plus computer with 48K of RAM and one disk drive. The price of PhotoCaster is \$499.95 for the basic system which includes an assembled and tested circuit board and software. A complete system consisting of a Panasonic WV1400 camera, board and software is available for \$749.95. California residents add applicable sales tax. VISA and Master Card orders are accepted.

SSTV "IT JUST ISN'T FUN ANYMORE..." by WB0QCD

The following is a letter we received recently, concerning what is happening or should we say "not happening" in SSTV today. Our comments follow; "Dear A5, I have been on SSTV for about 11 years now and have had every notable piece of slow scan television gear on the market and today have a ROBOT 400 including the 3-memory update from WA7WOD for receiving and sending color pictures. I have been quite concerned lately by the division of SSTV'ers into battling groups promoting various methods of producing SSTV formats. The mode that used to be respected for operators helping others has turned into a very selfish, profit-motivated segment of Amateur Radio. There must be some facts somewhere that many of us do not know about all the "behind the scenes" goings on. I hope things can return someday to the SSTV that I once enjoyed. "Where are the Generals on SSTV?" . -J. K. in Ohio

"Your letter is just one of dozens received on this subject this year. There is some real frustrations and hard feelings out there on SSTV frequencies that indeed has turned the video mode into a non-fun activity. When I got into SSTV in 1978, SSTV'ers took "pride" in creating and sending their own artwork over the airwaves. You're correct-the one thing that stood out most about SSTV'ers was the helping attitude everybody seemed to have for one another. That's all changed and perhaps along with a frustrating period of the nations economy, it isn't all that unforgiveable. It all seemed to start around the time the ROBOT 400 mods started coming out as information of the procedures was hard to get from the originators. Finally, after months of prodding, the mod was published in A5 MAGAZINE then owned by Henry Ruh. An incorrect "256" label was applied to a slower clock rate of the sync signal part of the modification with amazing reports of higher resolution pictures received by mod installers (still being claimed today). The mod's usefulness never caught on much and pretty well died out in 1980. A5 MAGAZINE had to "make a deal" with a Texas firm to publish yet another ROBOT mod giving 4 individual "mini-pictures" per frame for special effects as the information just wasn't being passed around freely. When I bought A5 MAGAZINE and published my second issue, I included the "agreed" advertisement on the SSTV color board system by the new Texas firm as it had not been run in the planned July 81 issue. I even went out of my pocket for a color sample front cover picture of the mod's usefulness. At the time of this situation, it began to strike me rather strange that "profiteering" had to be contracted to get out information that had always in the past been furnished to SSTV'ers openly. From that point on I began investigating various so called "progress" advancements by the firm to learn of first hand reports of "stolen ideas" from all parts of the country. It might interest you J.K. that the originators of the 3-memory add-on mod for the ROBOT 400 converter did indeed come from the great lonestar state of the south, but from a couple of inventors who you probably wouldn't recognize callsigns-not from the ones who are reaping the praise and financial awards today. Even a New Jersey SSTV'er is upset over the outright "stealing" of a multiplex circuitry design that was passed on for experimentation not production. Did you ever hear the callsign WB6VAB? He was on for a short time in 1981 working on and actually building a "cheaper" homebrew 3-memory Robot system-similar to the Texas board but at reasonable prices. His work quickly halted after a couple "threatening" letters (one from North Dakota and one from Virginia) stating to stay clear of presently available systems. WB6VAB was to have sent these homebrew schematics to A5 MAGAZINE for publishment, but has never been heard from again on SSTV frequencies. It was learned that about \$150.00 worth of parts (including board) is needed to complete the \$500 dollar retail system now being promoted today. I am all for design compensation and some profit, but what is being charged to today's "appliance operators" is a crime. W0LMD, a long time devoted SSTV experimenter and computer buff, recently sent 25 second one-frame color pictures to Texas along with design ideas only to see a few weeks later "a major breakthrough" announced by the Texas troubadours in a 25.5 second 1-frame color "mod" for the 3000C owners with schematics sent to paying customers only. Our requests to obtain the new mod have never been answered but thanks to W9RI the details were published in our September 82 issue. W0LMD mentions also to A5 that there are 2

major discrepancies with the current schematics that can cause inferior black & white as well as color pictures especially on "trigger sweep" monitors. Another non-crediting boast in which future ideas will certainly be kept even more secret is the deception of color greyscales and special effects soon to be announced in which a Canadian SSTV'er demonstrated at Dayton in 1981 and 1982. The so-called "256" and 4-3 Aspect Ratios" is not technically correct and is being perprotrated to the clan's following along with "almost as good as FSTV resolution" descriptions. Did you know J.K. that there are "dealers" out there making 20% commission on 3-memory ROBOT systems? I know, as I was offered a midwest "piece of the pie" about a year ago and turned it down saying that reduced expenses should be given to the average SSTV'er who has already paid an outrageous amount just to get into SSTV. Remember them apples the next time you hear "just how great their 3-memory system is working". There is rumored to be a sign on a rural country road in Virginia that says; "Eat more lamb, 50,000 coyotes can't be all wrong!"

Now there are even claims by WORLD RADIO SSTV column editor KB8LU of coercion and censorship by old time SSTV'ers against progress (September issue), K4TWJ's ISSN can't get off the ground because it wasn't allowed to be explained at Dayton or W9NTP dominates the ARRL National Convention at Cedar Rapids, Iowa by not letting others talk at SSTV forums. What a bunch of baloney! That's about as fair as Flynn's SC-422A review in August based on a 5 minute visit at KW Control's booth. It has been the MacDonalds, the Sudings, the Millers, the Abrams and others that have in the past years shared so openly their ideas and successes. These are the respected "leaders" that have made SSTV what it is today. It is through their guidance that new advances will come, not just stolen modifications that take the state of the art backwards instead of forward. Even today, a major breakthrough by Clay Abrams K6AEP with the TRS-80C Color Computer mentioned elsewhere in this A5 issue brings SSTV to even greater potential. Flynn was indeed recognized by W0LMD at the Friday night SSTV get-together, smiled at the applause but said nothing. WA7WOD was called for at the next day Saturday ATV forum by yours truly (a case of coors awaited him along with a color sstv award certificate) but did not attend. KB8LU mentioned on 20 meters one day that he had no intentions of going to the Cedar Rapids affair in July and indeed he didn't. You can't speak out Ron if you don't go! Just for the record, I conducted the National's ATV forums not Don Miller. Attributing the likes of WB4HCV to Copthorne MacDonald Ron, really? I guess you are too new to remember the stolen keyboard designs from W0LMD or the real "horror stories" being reported by SSTV'ers in the 1970's on HCV Enterprises somewhere between the "floods and fires"? Do your homework, Ron!

Where are the general class SSTV'ers you ask J.W.? It was a handful of these same selfish and vial Advanced class operators who "camped" out on 14.280 Mhz. during the February approval of Henry Ruh's (A5 MAGAZINE) FCC docket to allow SSTV on the general HF bands. 14.340 Mhz. was widely publicized (and still is today) as the meeting area for general class SSTV'ers. Even two nets were started on Sundays on the higher frequency, but met with problems as interested video operators became divided between the two frequencies. Eventually, the DX'ers and Net member stations ran the Advanced operators off the band (they say they were there because their swr was lower there) but at the expense of the general SSTV operators and were never seen or heard from again. Today, little if any organized SSTV activity exists in the general HF bands except on 10 meters at 28.680 Mhz. Hopefully, FCC '82-83 will bring a quick change to all that.

IN SUMMARY

All this negative pulicity, J. K., is intended to simply make SSTV'ers better aware of just what is really happening out there, and perhaps begin to change a mode that "just isn't fun anymore". Thank God for FSTV, at least when it gets political-it rarely goes out of state. As for the future of SSTV and if it looks like it will "turn around, the reverse side of that Virginia sign probably reads; "Will the Pope turn Protestant"? -WB0QCD



AMATEUR TELEVISION MAGAZINE

members' ads

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Looking for a manual for Sony Videoroner 11-battery VTR/video camera model AVC-3400. Also schematic for Conrac CZB-14 monitor; Miles Bruce W4YBH, Box 763, Cornelius, NC. Thanks to A5 ATV Magazine for the "free subscriber's" advertisement. 704-892-1804

B/W SSTV Scan Converter, 9" monitor (built in), 3-W9NTP color memory boards all put together and working, color encoder, all items for sale or trade? What have you got? Bob Blackstock WB5MRG, 6512 Polywebb, Arlington, Texas (817) 478-5707. Thanks A5!

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Robot 70/80 SSTV Converter/monitor with 5' and 15' cables and manuals, all in good working order \$300 FOB Dover, New Hampshire. Bill Dodge W1PEL, 78 Littleworth Rd, Dover, New Hampshire 03820. Area Code (603) 742-0130 after 5:00 pm. ET.

I have a SSTV receiver that I know little about. Can you help me out? It has 3-12AU 7's, 3-12AX7's, 2-6SN7's, and a 4510 P7 Cathode Ray tube. It has an internal power supply and 13 potentiometers and is built on a 3X7X17 inch chassis. It is a remarkably well engineered piece of gear purchased from estate. I would like to know more about and get it going as well as learn more about SSTV. Please call or write to Henry Heinrich W9KPG, 2961 Emalane Drive, Green Bay, Wisconsin 54301. 414-468-4268.

Does anyone have a schematic for a Midland model 15-520 B/W Camera? WBØZJP St. Louis, Missouri. Also looking for more St. Louis FSTV activity! Thanks A5!

I will trade 3 BETA blank tapes for every VHS blank. 50 left to trade. Wanted; diagram to repair Packard Bell 920 Video Camera. Also looking to buy or swap for 1296 Mhz. Varactor Tripler. Gerard Wilson WA6RDA, PO Box 241, Glen Ellen, California

Wanted; schematic for APECO B/W TV Camera using Nemco boards #81201-02, 81201-03, 81201-13. Chas. Wm. Fullerton, RR #1, Dugger, Indiana-47848.

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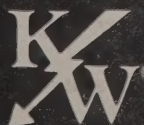
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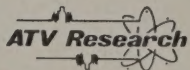
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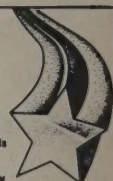
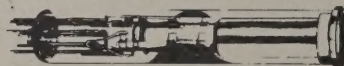
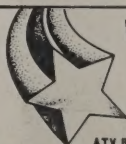
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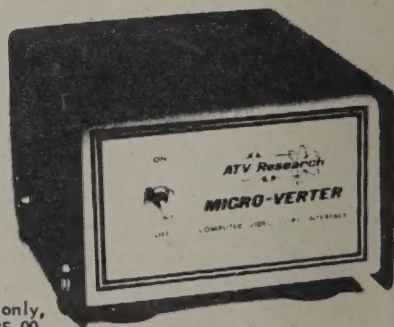
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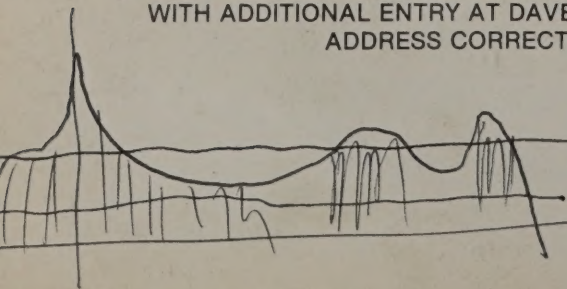
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